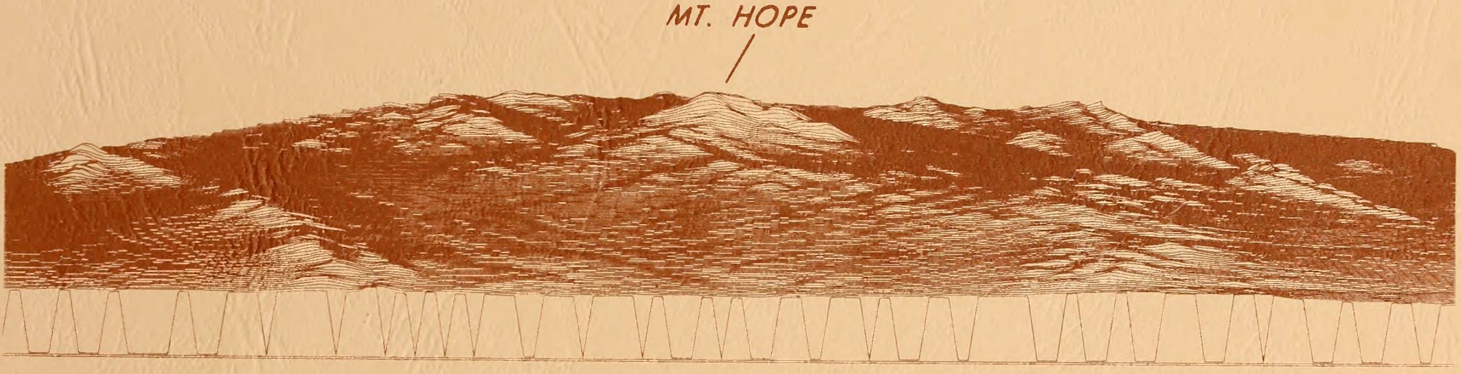
BLM LIBRARY
88046122

CULTURAL RESOURCES

TECHNICAL REPORT NO.7

MT. HOPE MOLYBDENUM PROJECT



View from the south looking north

U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
BATTLE MOUNTAIN, NEVADA

DECEMBER 1984

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

#-11950715

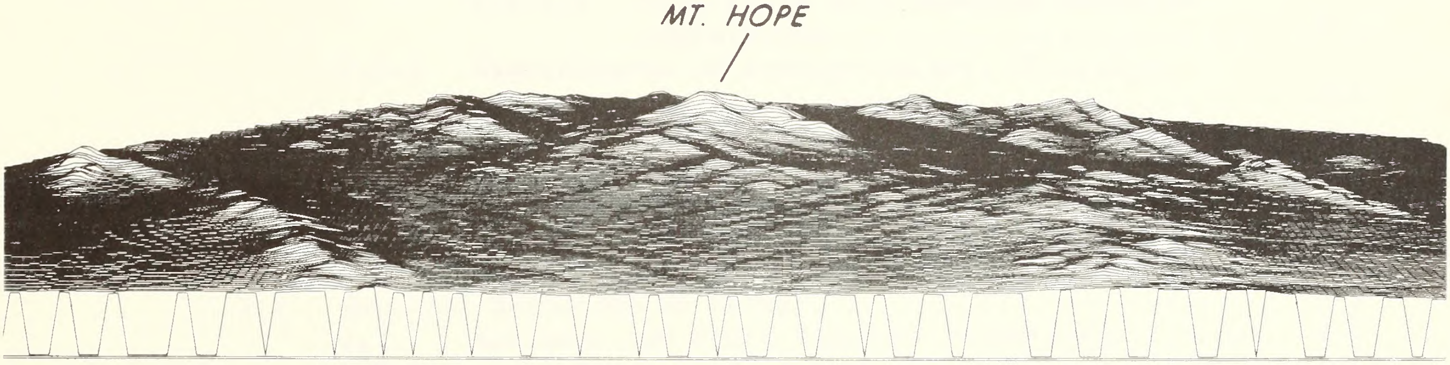
ID88046122

TD
195
.M5
M686
No. 7
1984

CULTURAL RESOURCES

TECHNICAL REPORT NO.7

MT. HOPE MOLYBDENUM PROJECT



View from the south looking north

U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
BATTLE MOUNTAIN, NEVADA

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

DECEMBER 1984

TABLE OF CONTENTS (cont)

PAGE

CHAPTER 4.0 - LIST OF PREPARERS.................................... 4-1

CHAPTER 5.0 - GLOSSARY... 5-1

CHAPTER 6.0 - BIBLIOGRAPHY... 6-1

APPENDIX 7-A A CLASS II ARCHEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA: VOLUME I............ A-1

APPENDIX 7-B AN ARCHEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA: VOLUME II..................... B-1

APPENDIX 7-C BLM CULTURAL RESOURCES REPORT DATED JULY 11, 1983..... C-1

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
1-1	State Map of Nevada	1-3
1-2	Proposed Project and Land Acquisition Area Map, Alternative 1-A	1-4
1-3	Regional Study Area Map Showing Proposed Action Components	1-5
1-4	Proposed Action	1-6
1-5	Regional Study Area Map Showing Alternative Components 2 and 3 to the Proposed Action	1-7
1-6	Alternative Routing Corridors for Water Line Right-of-Way	1-8
1-7	Regional Study Area Map Showing Alternative Component 4 to the Proposed Action	1-9
1-8	Alternative Land Acquisition Area	1-10
2-1	Location Map of Pony Express Commemorative Trail	2-26
2-2	Eureka Historical District	2-33

CHAPTER 1.0

INTRODUCTION

1.1 Introduction

This technical report presents detailed information concerning the cutural resource base of Eureka County and Mt. Hope area. Significant potential impacts to that resource base upon implementation of the proposed action and/or alternatives are identified in Chapter 3.0 and Appendix 7-A.

1.2 Project Description

Technical Report No.1 and Chapter 2.0 of the Mt. Hope Molybdenum Project EIS detail the proposed action and alternatives. In brief, the Mt. Hope Molybdenum Project Environmental Impact Statement (EIS) (including Technical Report Nos.1 thru 9) have been prepared in response to an EXXON Minerals Company (EXXON) proposal submitted to the Bureau of Land Management (BLM) for the purchase of public lands under Section 203 of the Federal Land Policy and Management Act (FLPMA) of 1976. Although the land purchase proposal is the action which occasions the Environmental Impact Statement (EIS) process, there are other federal decisions which must be made before EXXON may proceed. Among these are the granting of power, water line and highway relocation rights-of-way and the approval of a plan-of-operation.

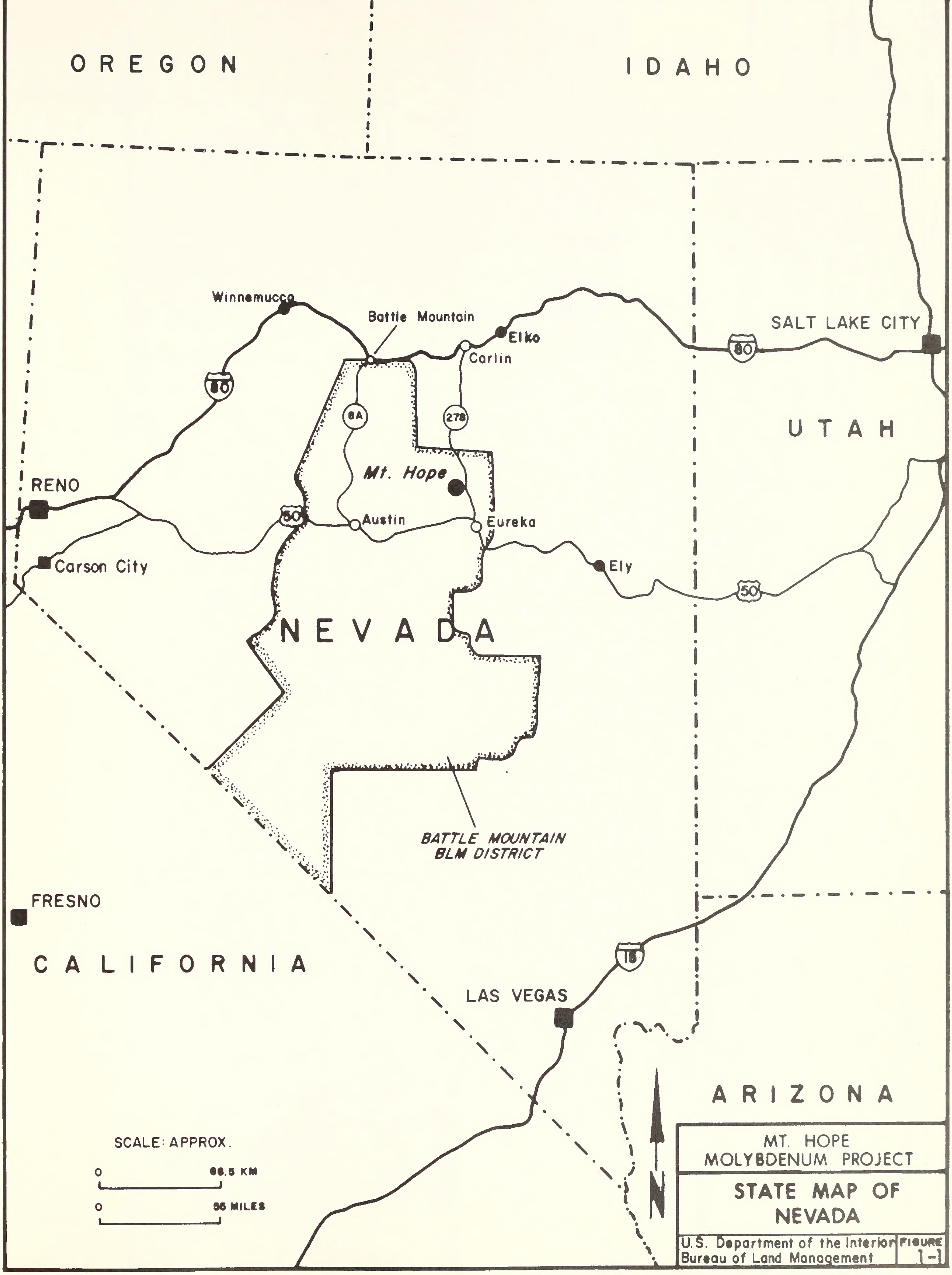
The primary purpose of the proposed sale of public lands involves the planned activities of EXXON which has for some time been conducting preliminary feasibility studies assessing the development of a molybdenum deposit in the vicinity of Mt. Hope near Eureka, Nevada. As part of the EIS process, EXXON has detailed its preliminary plans concerning project development. The Mt. Hope project includes the development of an open-pit mine, non-mineralized material storage areas (2), a process plant complex of approximately 100 acres and a tailings material disposal site. As support features to the project, a proposed water line and power line would also be necessary. The proposed tailings pond site would, if implemented, require an approximate six mile relocation of an existing state highway (State Route 278).

Figures 1-1 through 1-8 show project area location and depict the proposed action and alternatives (except the location of a subdivision plat). Table 1-1 outlines the components of the proposed action and alternatives, including the no action alternative.

1.3 Baseline Data Development

Early in the EIS process, the BLM and EXXON agreed in a Memorandum of Understanding (MOU) that the EIS process of data collection, analysis and documentation would be assisted by the involvement of an independent third party consultant, Wyatt Research and Consulting, Inc. (WRC). WRC initiated its involvement as an oversight quality assurance use in developing the Mt. Hope Molybdenum Project EIS. Entitled the Mt. Hope Molybdenum Project Environmental Impact Report (EIR), the source document included two chapters of information concerning environmental resources (baseline data and impact analyses) and prepared by WRC with assistance from the BLM and available study results of EXXON (e.g., cultural resources consultant report, geology, etc.). During the preparation of the source document and continuing throughout the EIS process, WRC has collected, reviewed and analyzed pertinent data in each of the necessary topical areas of environmental resources. Relative to the description and impact analysis of historic and prehistoric cultural resources on-site, however, the consulting firm Intermountain Research, Inc. (Carson City, Nevada) performed the work of significance under contract to EXXON Minerals Company and in coordination with both EXXON and the BLM. WRC responsibilities involved only the baseline description and impact analyses associated with the Town of Eureka and resident county populations (pre-project, project).

This technical report documents the majority of information gathered and analyzed that was pertinent to regional and site-specific cultural resources. The primary sources of information are included in the bibliography of this Technical Report (Chapter 6.0) and the bibliography of the appended Intermountain Research archaeological survey report (Appendix 7-A and 7-B).



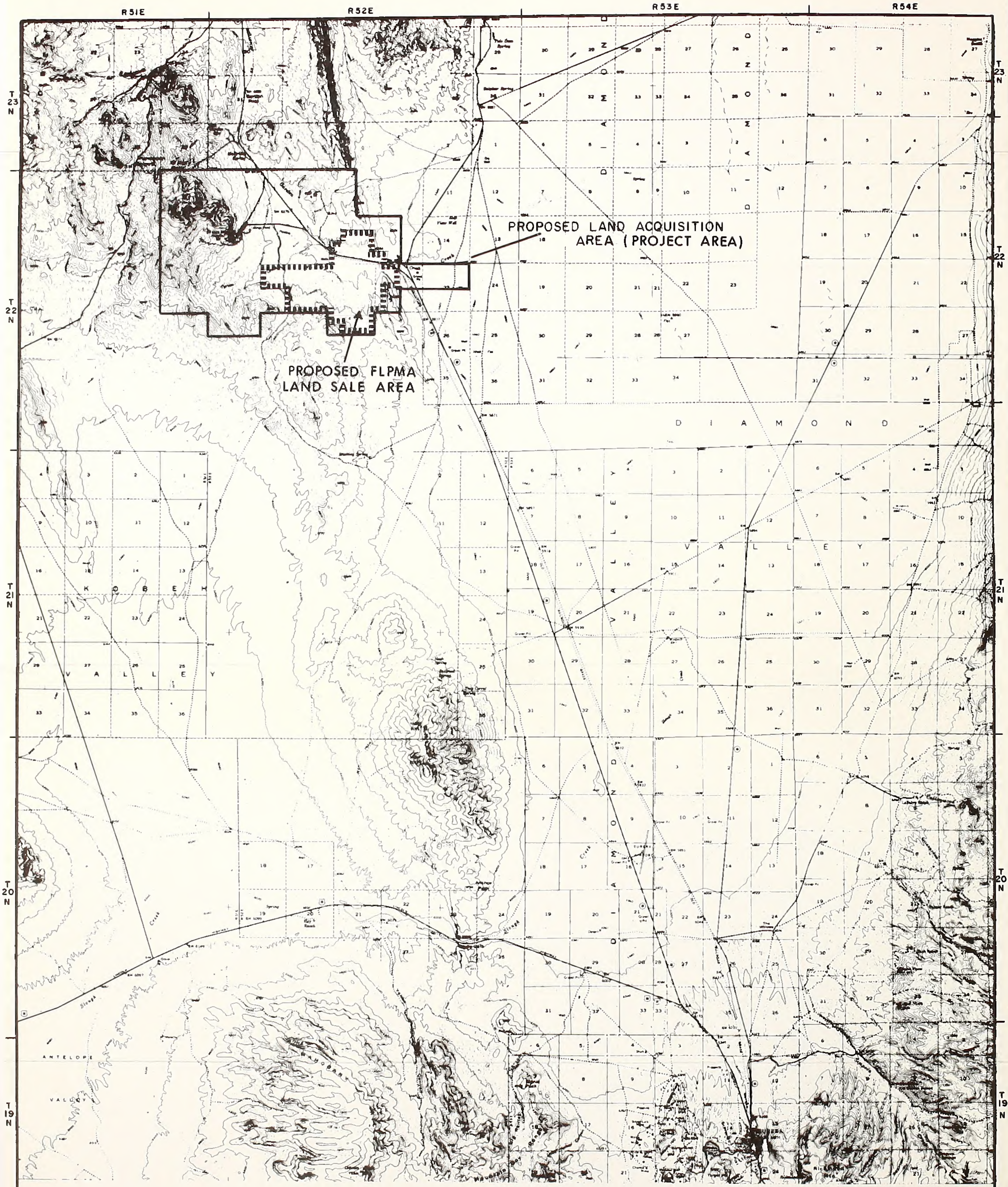
OREGON
IDAHO
Winnemucca
Battle Mountain
Elko
Carlin
SALT LAKE CITY
80
80
80
8A
278
UTAH
Mt. Hope
RENO
50
Austin
Eureka
Carson City
Ely
50
NEVADA
BATTLE MOUNTAIN
BLM DISTRICT
FRESNO
CALIFORNIA
15
LAS VEGAS
ARIZONA
N
SCALE: APPROX.
0
88.5 KM
0
55 MILES

MT. HOPE
MOLYBDENUM PROJECT

STATE MAP OF
NEVADA

U.S. Department of the Interior
Bureau of Land Management

FIGURE
1-1


R51E
R52E
R53E
R54E
T 23 N
T 22 N
T 21 N
T 20 N
T 19 N
PROPOSED LAND ACQUISITION AREA (PROJECT AREA)
PROPOSED FLPMA LAND SALE AREA
DIAMOND
DIAMOND VALLEY
VALLEY
KOBEH VALLEY
ANTELOPE VALLEY

——— PROPOSED LAND ACQUISITION AREA (PROJECT AREA)

▮▮▮▮▮▮▮▮▮ ESTIMATION OF APPROXIMATE FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA) SALE AREA

Nevada
MAP AREA

0 1 2 3 4 5 Miles

0 1 2 3 4 5 6 7 8 Km.

N

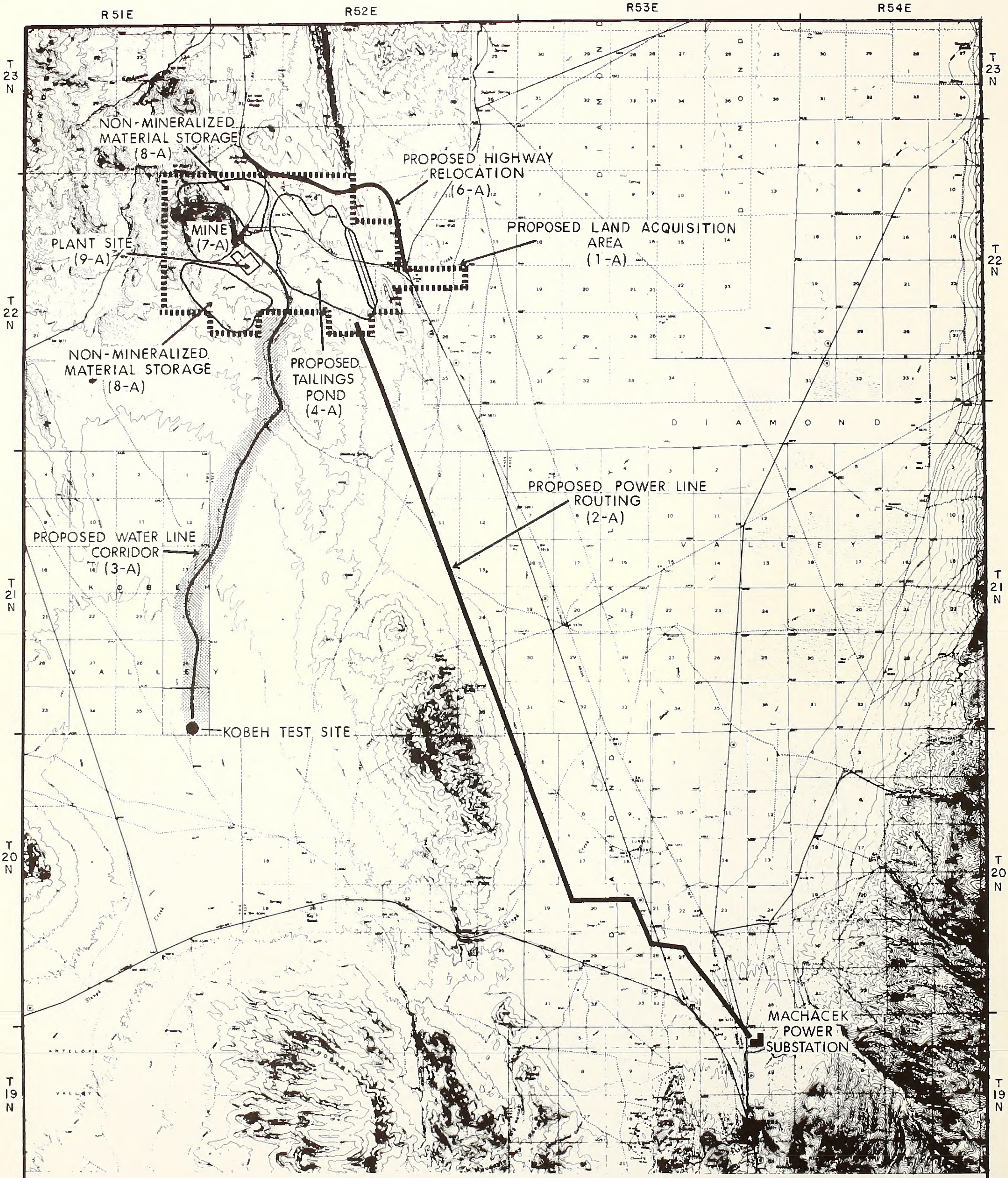
BASE: USGS TOPO QUADRANGLES, GARDEN VALLEY, WHISTLER MTN., DIAMOND SPRINGS & EUREKA, NEVADA.

MT. HOPE MOLYBDENUM PROJECT

PROPOSED PROJECT AND LAND ACQUISITION AREA MAP ALTERNATIVE I-A

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-2


R51E
R52E
R53E
R54E
T 23 N
T 22 N
T 21 N
T 20 N
T 19 N
NON-MINERALIZED MATERIAL STORAGE (8-A)
PROPOSED HIGHWAY RELOCATION (6-A)
PLANT SITE (9-A)
MINE (7-A)
PROPOSED LAND ACQUISITION AREA (1-A)
NON-MINERALIZED MATERIAL STORAGE (8-A)
PROPOSED TAILINGS POND (4-A)
DIAMOND
PROPOSED POWER LINE ROUTING (2-A)
VALLEY
PROPOSED WATER LINE CORRIDOR (3-A)
KOBEH
VALLEY
KOBEH TEST SITE
MACHACEK POWER SUBSTATION
ANTELOPE
VALLEY
DIAMOND

▮▮▮▮▮▮▮▮▮▮▮▮▮ PROPOSED LAND ACQUISITION AREA BOUNDARY

*NOTE: COMPONENT 5-A (HOUSING SUBDIVISION) NOT SHOWN.
ALTERNATIVE 1-A (INCLUDING FLPMA LAND SALE AREA) SHOWN
ON FIGURE 2-1.

0 1 2 3 4 5 Miles

0 1 2 3 4 5 6 7 8 Km.

Nevada MAP AREA

N

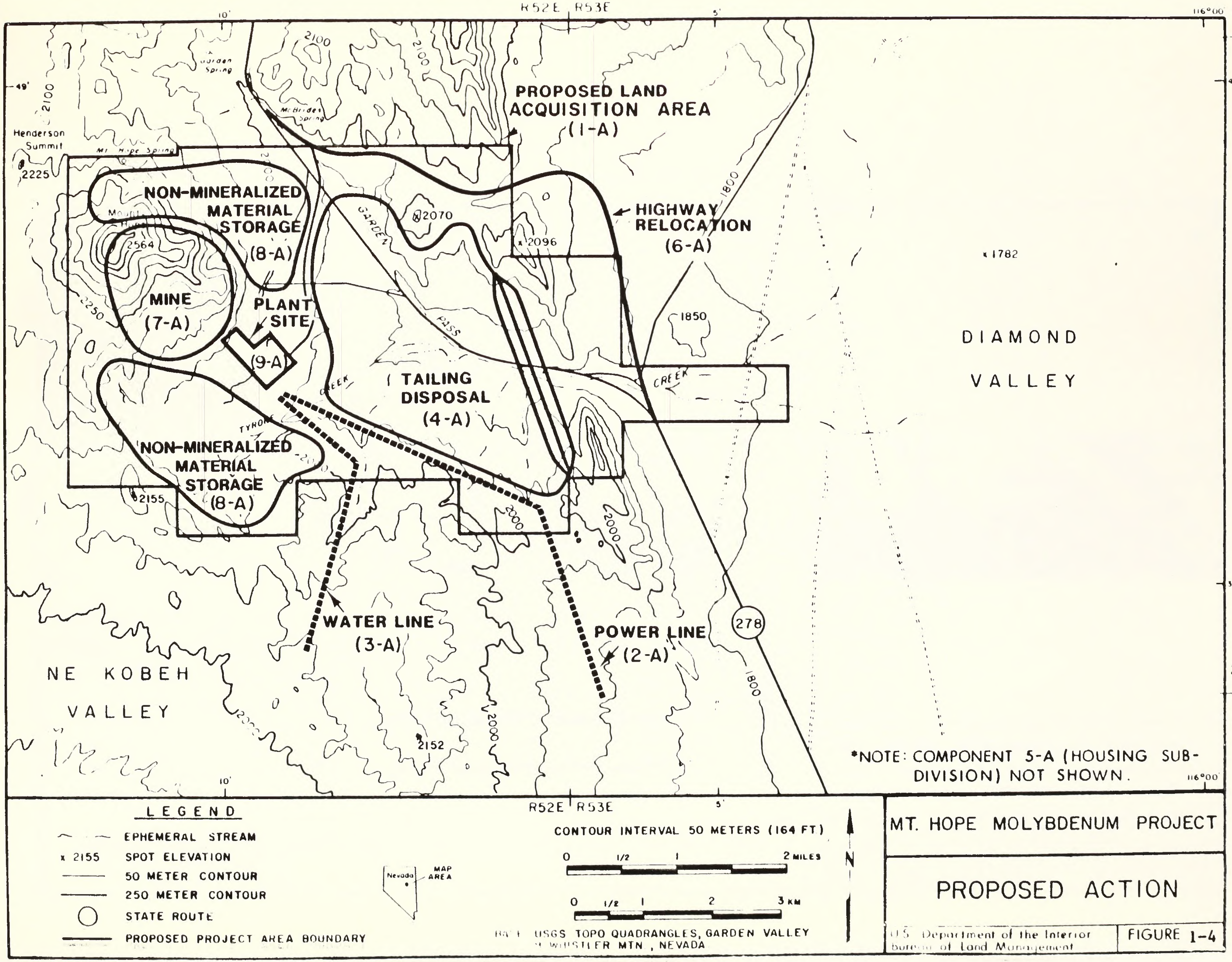
BASE: USGS TOPO QUADRANGLES, GARDEN VALLEY, WHISTLER MTN., DIAMOND SPRINGS & EUREKA, NEVADA.

MT. HOPE MOLYBDENUM PROJECT

REGIONAL STUDY AREA MAP
SHOWING
PROPOSED ACTION COMPONENTS

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-3



R52E R53E
10'
5'
116°00'
T 23 N
49'
T 22 N
T 21 N
39°45'
Henderson Summit
2225
2100
Garden Spring
McBrides Spring
Mt. Hope Spring
Mount Hope
2564
2250
2155
2070
2096
1850
1782
2152
2000
1800
GARDEN
PASS
CREEK
TYRONE
PROPOSED LAND ACQUISITION AREA (1-A)
HIGHWAY RELOCATION (6-A)
NON-MINERALIZED MATERIAL STORAGE (8-A)
MINE (7-A)
PLANT SITE (9-A)
TAILING DISPOSAL (4-A)
NON-MINERALIZED MATERIAL STORAGE (8-A)
WATER LINE (3-A)
POWER LINE (2-A)
278
DIAMOND VALLEY
NE KOBEH VALLEY
LEGEND
EPHEMERAL STREAM
x 2155 SPOT ELEVATION
50 METER CONTOUR
250 METER CONTOUR
STATE ROUTE
PROPOSED PROJECT AREA BOUNDARY
Nevada
MAP AREA
CONTOUR INTERVAL 50 METERS (164 FT)
0 1/2 1 2 MILES
0 1/2 1 2 3 KM
N

*NOTE: COMPONENT 5-A (HOUSING SUB-DIVISION) NOT SHOWN.

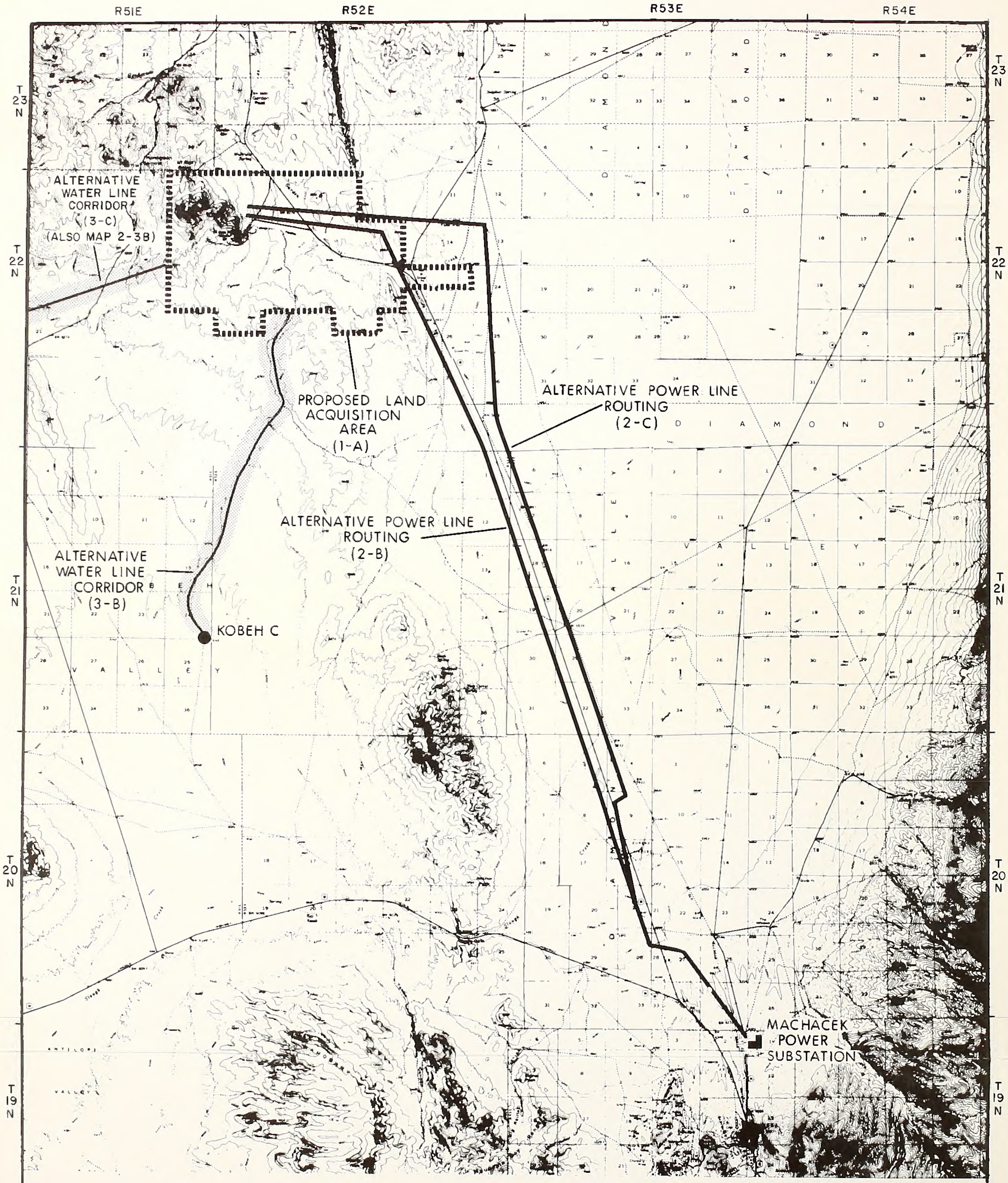
BASE: USGS TOPO QUADRANGLES, GARDEN VALLEY & WHISTLER MTN, NEVADA

MT. HOPE MOLYBDENUM PROJECT

PROPOSED ACTION

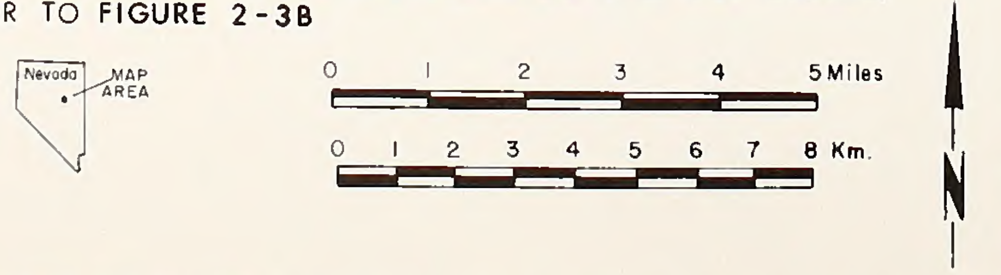
U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-4


R51E
R52E
R53E
R54E
T 23 N
T 22 N
T 21 N
T 20 N
T 19 N
ALTERNATIVE WATER LINE CORRIDOR* (3-C) (ALSO MAP 2-3B)
PROPOSED LAND ACQUISITION AREA (1-A)
ALTERNATIVE POWER LINE ROUTING (2-C)
ALTERNATIVE POWER LINE ROUTING (2-B)
ALTERNATIVE WATER LINE CORRIDOR (3-B)
KOBEH C
MACHACEK POWER SUBSTATION
DIAMOND
DIAMOND VALLEY
KOBEH VALLEY
ANTELOPE VALLEY

▮▮▮▮▮▮▮▮ PROPOSED LAND ACQUISITION AREA BOUNDARY

*NOTE: ENTIRE EXTENT OF WATER LINE CORRIDOR 3-C NOT SHOWN, REFER TO FIGURE 2-3B


Nevada
MAP AREA
0 1 2 3 4 5 Miles
0 1 2 3 4 5 6 7 8 Km.
N

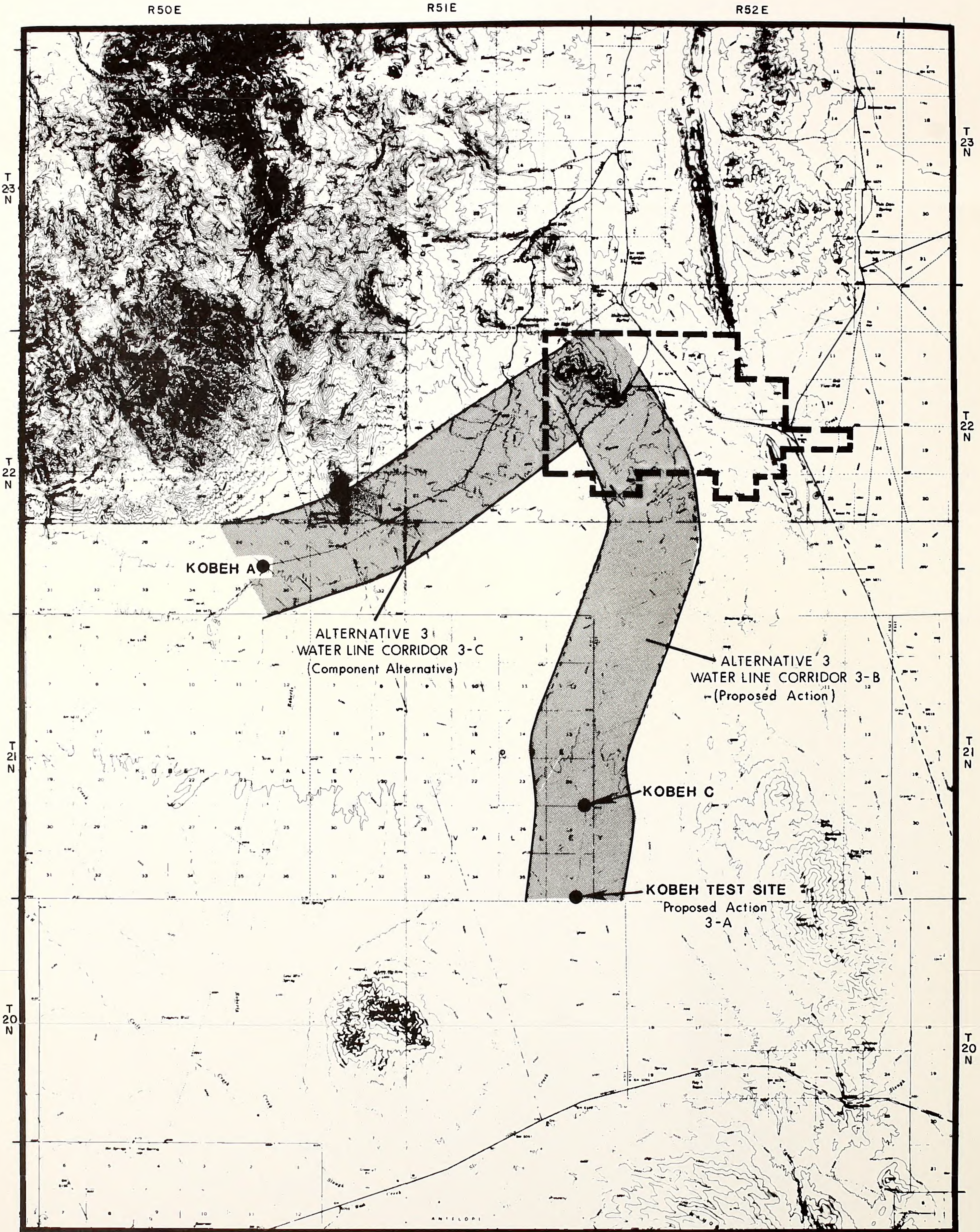
BASE: USGS TOPO QUADRANGLES, GARDEN VALLEY, WHISTLER MTN., DIAMOND SPRINGS & EUREKA, NEVADA.

MT. HOPE MOLYBDENUM PROJECT

REGIONAL STUDY AREA MAP SHOWING ALTERNATIVE COMPONENTS 2 AND 3 TO THE PROPOSED ACTION

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-5


R50E
R51E
R52E
T 23 N
T 22 N
T 21 N
T 20 N
KOBEH A
ALTERNATIVE 3
WATER LINE CORRIDOR 3-C
(Component Alternative)
ALTERNATIVE 3
WATER LINE CORRIDOR 3-B
(Proposed Action)
KOBEH C
KOBEH TEST SITE
Proposed Action
3-A
KOBEH VALLEY

▬ ▬ PROPOSED LAND ACQUISITION AREA BOUNDARY

▨ ALTERNATIVE WATER LINE RIGHT-OF-WAY

Nevada
MAP AREA

0 1 2 3 4 5 Miles

0 1 2 3 4 5 6 7 8 Km

N

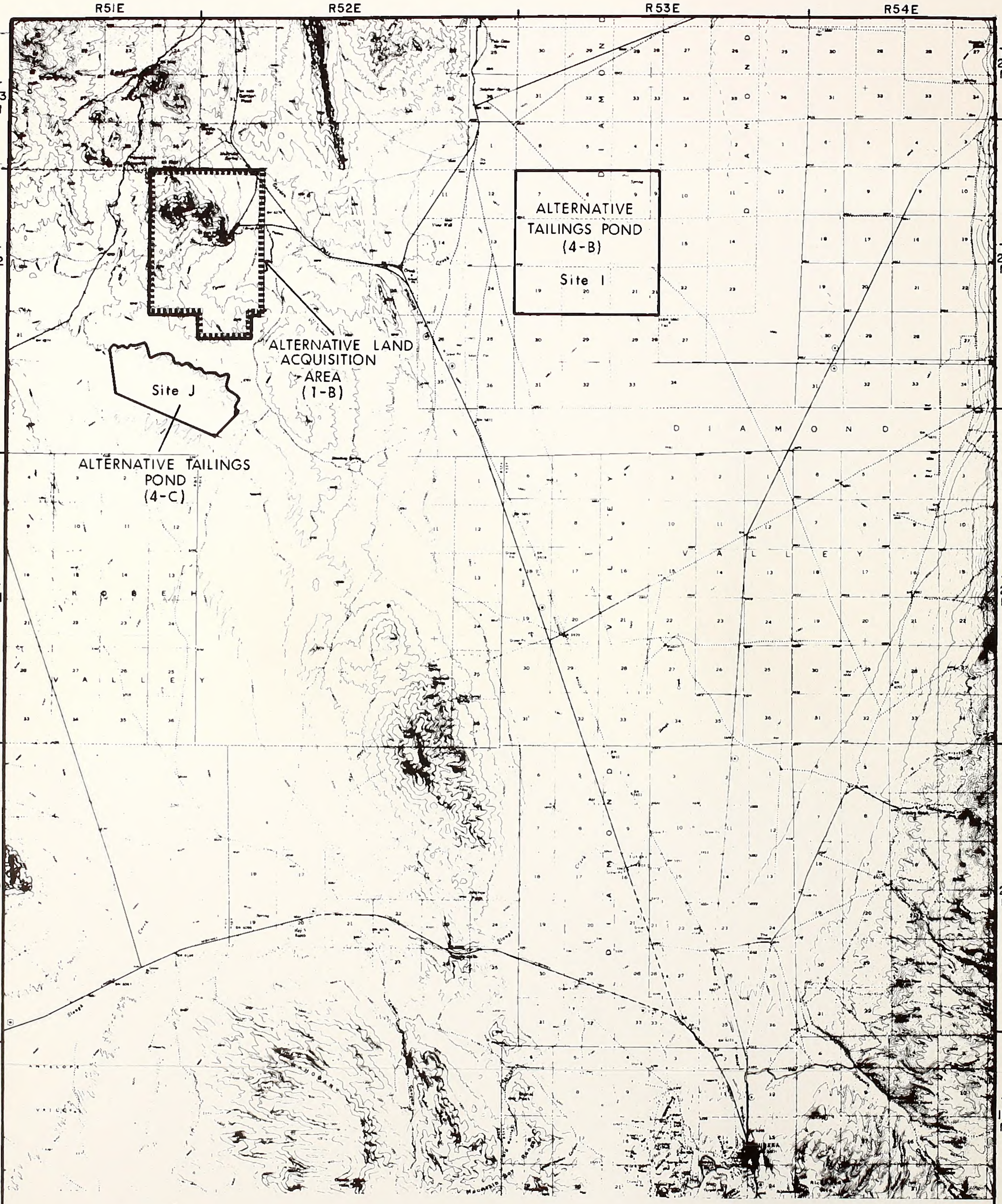
BASE USGS TOPO QUADRANGLES, GARDEN VALLEY, WHISTLER MTN., ROBERTS CREEK MTN. & BARTINE RANCH, NEVADA.

MT. HOPE MOLYBDENUM PROJECT

ALTERNATIVE ROUTING CORRIDORS FOR WATER LINE RIGHT-OF-WAY (ALTERNATIVE 3 CONTINUED FROM FIGURE 2-3A)

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-6


R51E
R52E
R53E
R54E
T 23 N
T 22 N
T 21 N
T 20 N
T 19 N
ALTERNATIVE TAILINGS POND (4-B)
Site I
ALTERNATIVE LAND ACQUISITION AREA (1-B)
Site J
ALTERNATIVE TAILINGS POND (4-C)
DIAMOND VALLEY
KOBEH VALLEY
ANTELOPE VALLEY
ALTERNATIVE LAND ACQUISITION AREA BOUNDARY
Nevada
MAP AREA
0 1 2 3 4 5 Miles
0 1 2 3 4 5 6 7 8 Km.
N

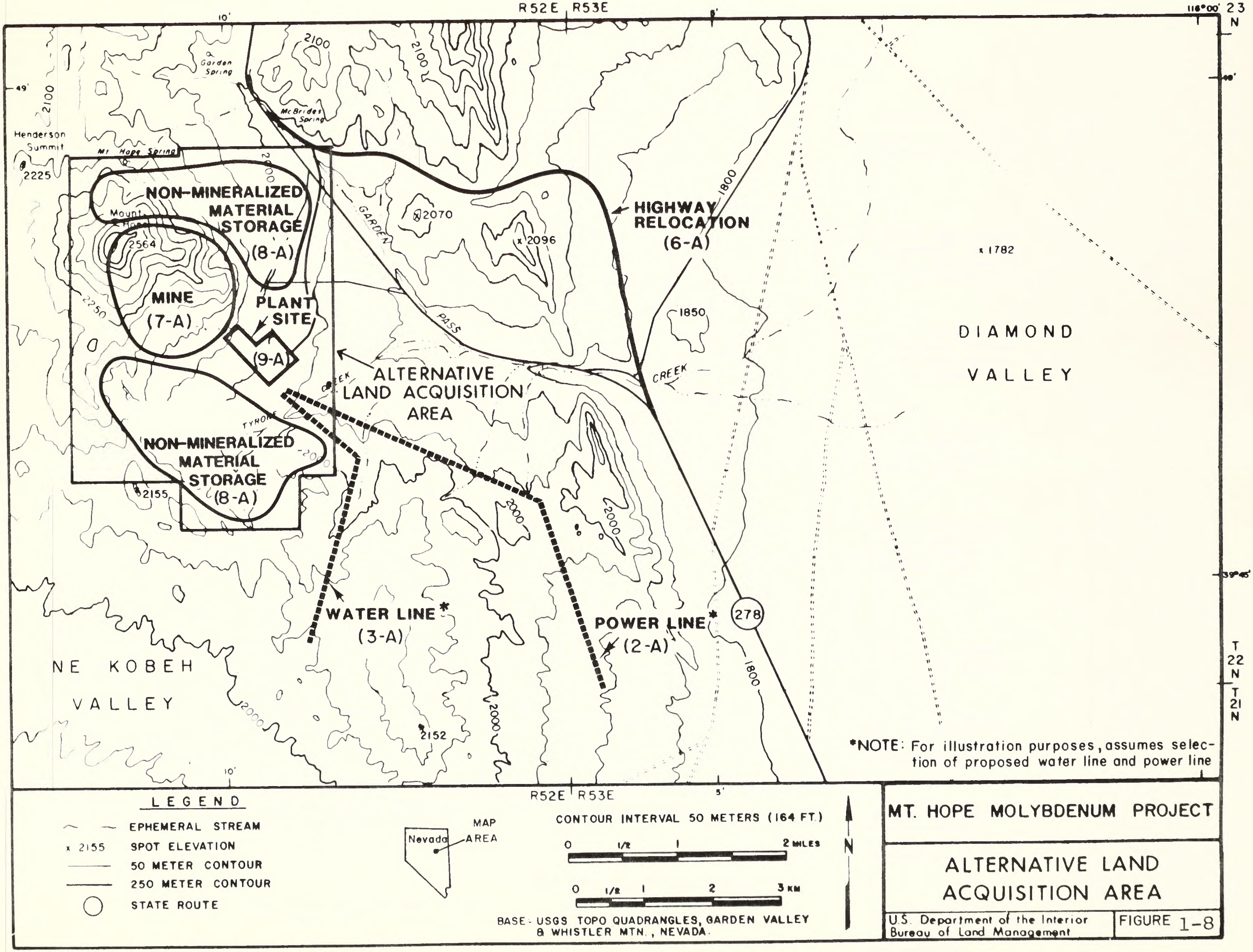
BASE: USGS TOPO QUADRANGLES, GARDEN VALLEY, WHISTLER MTN., DIAMOND SPRINGS & EUREKA, NEVADA.

MT. HOPE MOLYBDENUM PROJECT

REGIONAL STUDY AREA MAP SHOWING ALTERNATIVE COMPONENT 4 TO THE PROPOSED ACTION

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-7


R52E R53E
10'
5'
118°00'
T 23 N
49'
39°45'
T 22 N
T 21 N
2100
Garden Spring
McBrides Spring
Henderson Summit
2225
Mt Hope Spring
Mount Hope
2564
2250
2155
2152
2070
2096
1850
1800
2000
1782
GARDEN
PASS
CREEK
TYRONE
NON-MINERALIZED MATERIAL STORAGE (8-A)
MINE (7-A)
PLANT SITE (9-A)
NON-MINERALIZED MATERIAL STORAGE (8-A)
ALTERNATIVE LAND ACQUISITION AREA
HIGHWAY RELOCATION (6-A)
DIAMOND VALLEY
WATER LINE* (3-A)
POWER LINE* (2-A)
278
NE KOBEH VALLEY
LEGEND
EPHEMERAL STREAM
x 2155 SPOT ELEVATION
50 METER CONTOUR
250 METER CONTOUR
STATE ROUTE
Nevada
MAP AREA
CONTOUR INTERVAL 50 METERS (164 FT.)
0 1/2 1 2 MILES
0 1/2 1 2 3 KM
N

*NOTE: For illustration purposes, assumes selection of proposed water line and power line

BASE - USGS TOPO QUADRANGLES, GARDEN VALLEY & WHISTLER MTN., NEVADA.

MT. HOPE MOLYBDENUM PROJECT

ALTERNATIVE LAND ACQUISITION AREA

U.S. Department of the Interior
Bureau of Land Management

FIGURE 1-8

Table 1-1 Summary Details of the Proposed Action and Alternatives including the No Action Alternative

Proposed Action	Alternative 1 - Land Acquisition Components	No Action Alternative
1-A Land Sale by FLPMA	1-B Mineral Claims 1-C Land Use Lease 1-D Land Use Permit 1-E Land Exchange	Negative or no decision regarding land sale.
	Alternative 2 - Power Line Routing Components	
2-A Power Line Routing A (Figure 1-2)	2-B Alternative Routing 2-B (Figure 1-4) 2-C Alternative Routing 2-C (Figure 1-4)	No power line right-of way granted. Assumes the Mt. Hope Project will not proceed.
	Alternative 3 - Water Line Routing Components	
3-A Water Line Routing A (Figure 1-2)	3-B Alternative Routing 3-B (Figure 1-4) 3-C Alternative Routing 3-C (Figure 1-5)	No water line right-of-way granted. Assumes the Mt. Hope Project will not proceed.
	Alternative 4 - Tailings Pond Sites Components	
4-A Tailings Pond at Location 4-A (Figure 1-3)	4-B Alternative Site 4-B 4-C Alternative Site 4-C (Figure 1-4)	Not part of federal decision-making. Assumes no project implementation.
	Alternative 5 - Housing	
5-A Subdivision (Not shown on figure)	5-B Decentralized Workforce Housing (Not shown on figure)	Not part of federal decision-making. Assumes no project implementation.
	Alternative 6 - Highway Relocation Component	
6-A Highway Relocation Routing 6-A (Figure 1-3)	No reasonable alternatives available	No road relocation right-of-way granted.
	Alternative 7 - Mine	
7-A Mine at Location 7-A (Figure 1-3)	No reasonable alternatives available	Not part of federal decision-making. Assumes no project implementation.
	Alternative 8 - Non-Mineralized Material Storage Areas	
8-A Non-Mineralized Material Storage at Location 8-A (Figure 1-3)	No reasonable alternatives available	Not part of federal decision-making. Assumes no project implementation.
	Alternative 9 - Process Plant	
9-A Process Plant at Location 9-A (Figure 1-3)	No alternatives proposed. (Proposed action is worst-case. See text).	Not part of federal decision-making. Assumes no project implementation.

1.4 Impact Analyses Methodology

In the event of any discrepancies between this technical report and the EIS, the material presented in the EIS shall supercede that which is presented in this technical report.

Analysis of impact potential upon cultural resources involves a detailed sequential process of 1) determination of location; 2) determination of significance; and 3) determination of mitigation potential. Additionally, the analysis of impact potential relies upon significant consultation efforts among industry, consultants and regulatory entities. To effectively document in this Technical Report the comprehensive impact analysis conducted, particularly with respect to the physical disturbance (via tailings material placement, pit development, etc.) of on-site cultural resources), discussion has been presented as listed in the following:

1. Chapter 2.0 - Definition of Cultural Resources
   - presents detailed discussion concerning the Historic Preservation Systems as presently existing (Section 2.1).

   - also presents the definition of significance, both in terms of scientific value and cultural value (Section 2.2).

2. Chapter 3.0 - Impacts
   - presents analysis of population influx relative to potential for physical disturbance within the Eureka Town National Historic District area (Section 3.3). Section 3.3 is a brief overview of the specific socio-economic analyses documented in Technical Report No.9.

3. Appendices 7-A and 7-B - Archaeological Survey Reports
   - presents as-received copies of the Intermountain Research survey reports specific to the project area. Detailed discussion of potential significance, impacts and mitigation are included.

CHAPTER 2.0

BASELINE CULTURAL RESOURCES DESCRIPTION

2.1 Definition of Cultural Resources

Cultural resources are remains of prehistoric, historic and present activities. This would include prehistoric and historic districts, sites, structures and other evidence of human use or occupation considered to be of some significance to a culture, subculture, or a community for scientific, traditional, religious and other reasons. Cultural resources may be prehistoric aboriginal sites, historic Native American and Euroamerican areas of occupation and activity, and features of the natural environment such as sacred sites, which are generally geographic areas.

"Sites may consist of or contain artifacts (tools or other products of human manufacturing or use); food remains such as animal bones and charred plant remains; buildings and communities; environmental data such as evidence of past climate and plant communities; and sacred location (sic) objects, plants or animals" which are important to living peoples' traditions and/or religions (Final Shoshone-Eureka Resource Management Plan and EIS, 1984).

2.1.1 Historic Preservation System

The historic preservation system is the process which has evolved from the protection of cultural resources by various statutory laws, the procedures for complying with these laws, and the agencies involved. The cultural resource laws and compliance process is summarized here and a discussion of the significance of archaeological, historical and architectural resources follows. Both topics have been directly abstracted from the M-X EIS ETR 23, Cultural Resources [Henningson, Durham and Richardson (HDR), 1980].

2.1.1.1 Cultural Resource Laws and Regulations

1. National Historic Preservation Act (NHPA)

This law created the National Register of Historic places and established the Advisory Council on Historic Preservation. Section 106 of this Act requires that federal agencies take into account the effect of any undertaking on properties included on or eligible for the National Register. In addition, the Advisory Council must be afforded an opportunity to comment on such an undertaking.

2. National Environmental Policy Act

This Act and the guildelines of the Council on Environmental Quality (CEQ) require federal agencies to consider and evaluate the impact on the environment of all federal actions. Potential impacts to cultural resources are considered as part of this process.

3. Executive Order 11593

Directs federal agencies to identify and nominate historic properties to the National Register (this part of the Order applies to land holding agencies). The Order also requires that all federal agencies exercise care to avoid unnecessarily damaging properties that might be eligible for the National Register.

4. Archaeological and Historic Preservation Act (sometimes referred to as the Moss-Bennett Act)

This law authorizes federal agencies impacting archaeological and historic resources to expend funds (up to one percent of total project cost) for the proper recovery of data from these resources. Such funds are made available after project impacts have been identified and assessed in the project planning process. This Act also authorizes Interagency Archaeological Services (IAS) of the Heritage Conservation and Recreation Service to review data recovery programs to ensure that they comply with historic preservation legislation.

5. 36 Code of Federal Regulations (CFR) 800 - Protection of Historic and Cultural Properties

These regulations implement Section 106 of the National Historic Preservation Act and Executive Order 11593, and they provide step-by-step procedures for compliance with the above legislation.

2.1.1.2 Participants in the Historic Preservation System

1. The Advisory Council on Historic Preservation

The Advisory Council became an independent agency of the U.S. government in 1976. The division known as the Office of Review and Compliance enforces agency compliance with the Council's procedures, comments on environmental impact statements, and alerts agencies when they appear to be in non-compliance. The Council guidelines, 36 CFR 800, define the council's functions. Principally, the Council must be afforded an opportunity to comment on any project having an effect on cultural resources. If the effect is adverse, the Council is party to the execution of a Memorandum of Agreement which details the actions to be taken by the Agency with the concurrence of the State Historic Preservation Officer (SHPO) to avoid or mitigate the adverse effects on the cultural resources.

2. Office of Archaeology and Historic Preservation (OAHP)

Numerous historic preservation programs fall under OAHP. Two key divisions include the National Register of Historic Places and Interagency Archaeological Services.

National Register. This division receives nominations of properties to the Register from other agencies, verifies the accuracy of the information, accepts or rejects property nominations, and publishes an updated listing of National Register properties. As a result of E.O. 11593, federal agencies are required to take care not to damage Register-eligible properties. This division processes requests for "determinations of eligibility" after these requests have been reviewed by the SHPO.

Interagency Archaeological Services (IAS). As its name suggests, a major function of this division is to assist other federal agencies to comply with cultural resource legislation. Frequently, this means actually assuming responsibility for the identification (inventory) and evaluation of cultural resources within the project area which may be eligible for the National Register, and taking the appropriate mitigation measures. To do this, IAS can either perform the necessary work themselves or subcontract for these services. The agency transfers funds to IAS sufficient to achieve compliance with preservation legislation, and IAS charges the agency a percentage of the total amount of contract services for facilitating the agency's compliance requirements. In addtion, IAS serves in a review capacity at various project phases.

3. State Historic Preservation Officer

The SHPO is a key participant in the historic preservation system and is consulted and involved at every step in the compliance process. The SHPO is responsible for a wide range of activities including supervision of the State Historic Preservation staff, ensuring that nominations are prepared and submitted to the National Register, supervision of an environmental review process to ensure that historic properties are considered in federal planning, participation in the compliance activities of federal agencies under the procedures of the Advisory Council, and supervision of comments on environmental impact statements. The SHPO is a political appointee of the governor, and the minimum requirements for the staff are that it include a professional archaeologist, historian, and architect or architectural historian. Professional qualifications for this staff are outlined in 36 CFR 61.5

4. Land Management Agencies

Agencies such as the BLM are directed by E.O. 11593 to inventory all properties on their lands which qualify for the National Register. Considering the vast area to be surveyed, fulfillment of this requirement will take many years of survey work. Another requirement is to ensure that potentially qualifying properties are not impacted. Therefore, not only must the impacts of BLM projects be assessed but the impacts of other agency pro-

jects are, in part, their responsibility as well. Cooperation is required, but the agency responsible for the potential impacts is usually considered the lead agency responsible for complying with preservation legislation.

5. Construction Agencies

Agencies involved in construction have some of the clearest responsibilities. They must identify archaeological and historical properties subject to direct and indirect impacts and determine the eligibility of such properties to the National Register in consultation with the SHPO and Advisory Council. These consultations and the studies undertaken to identify cultural resources should be documented in any environmental impact statement prepared on the project.

2.1.1.3 Compliance with Cultural Resource Legislation

While it is mandated by NEPA that the potential for impacts to cultural resources be considered as part of the environmental planning process of a project, the historic preservation system has developed specific procedures for implementing this requirement. Three general points emphasize that historic preservation studies are required early in the environmental planning process:

- Preliminary consultation with the SHPO is required in order to determine the need for a survey.
- Intensive survey is implemented after consultation with the SHPO.
- Determination of eligibility to the National Register, determination of effect, and development of a preservation plan generally should occur by the time a Draft EIS is issued.

Once a complete inventory of the cultural resources within a project area has been assembled (which almost always requires an intensive survey of the entire area), then the federal agency must comply with the regulations established by the Advisory Council on Historic Preservation in 36 CFR 800.

This involves submitting the cultural resource inventory to the SHPO whose responsibility it is to determine which of the properties in the inventory are listed on or eligible for the National Register. The SHPO then determines whether the project will have any effect on National Register or Register-eligible properties. A "no effect" determination enables the project to proceed without further consultation. If the SHPO determines there will be an effect, then it is necessary to apply the criteria of "adverse effect" (36 CFR 800.3). A "no adverse effect" determination is usually possible in situations where the SHPO decides that the property that will be affected has only scientific value that may be preserved by implementation of a data recovery program. After making such a determination the SHPO forwards this opinion and relevant documentation to the Advisory Council for their comment. If the Advisory Council concurs, a data recovery program is implemented and the project is authorized to proceed.

2.1.2 Significance of Archaeological, Historical, and Architectural Resources

2.1.2.1 Scientific Significance

Cultural resources are evaluated for their potential to establish reliable generalizations about human behavior, particularly explanation of variability and change in societies and cultures. Generalizations and explanations require controlled comparison of relevant data concerning past human life. This includes such things as artifacts, settlements, food remains, and evidence for past environments. Scientific significance depends on the degree to which archaeological resources in the project or program area contain data appropriate for answering various substantive, technical, methodological, or theoretical questions. The value of these data should be determined in the regional context of the project or program and in relation to general anthropological problems.

2.1.2.2 Cultural Significance

Cultural resources are evaluated in terms of those values consisting of the direct and indirect ways in which society at large benefits from study and preservation of cultural resources. Benefits which should be described

and included are: (1) the acquisition of knowledge concerning man's past and its potential use, (2) the acquisition and preservation of objects, sites, structures, etc. for public education and enjoyment, (3) education and economic benefits from archaeological exhibits, and (4) practical applications of scientific findings acquired through archaeological investigations.

In addition, sites of cultural significance to Native Americans are assessed for their secular or sacred value.

2.1.2.3 National Register Sites and Eligible Properties

Cultural resources are evaluated in terms of the criteria for evaluation for inclusion on the National Register as defined in 36 CFR 60.6.

Criteria for evaluation. "The criteria applied to evaluate properties for possible inclusion in the National Register are listed below. These criteria are worded in a manner to provide for the diversity of resources. The following criteria shall be used in evaluating properties for nomination to the National Register, by the National Park Service in reviewing nominations, and for evaluating National Register eligibility of properties affected by federal agency undertakings.

National Register criteria for evaluation: The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant in our past; or

(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a

master, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded, or may be likely to yield, information important in prehistory or history.

Criteria considerations: Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

(a) A religious property deriving primary significance primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event.

(b) A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event.

(c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.

(d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.

(e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived.

(f) A property primarily commemorative in intent of design, age, tradition, or symbolic value has invested it with its own historical significance.

(g) A property achieving significance within the past 50 years if it is of exceptional importance."

2.2. CULTURAL RESOURCES OF NEVADA

The following information (Sections 2.2.1, 2.2.2 and 2.2.3) on the cultural resources of Nevada have been abstracted from the M-X EIS ETR 23, Cultural Resources (HDR, 1980). Additional information provided by Intermountain Research is presented in Appendices 7-A and 7-B.

2.2.1 National and State Register Properties

The National Register of Historic Places is the nation's official list of properties worthy of preservation for significance in American history, architecture, archaeology, and culture.

For Nevada, all historic and prehistoric properties listed on the National Register as of December 21, 1983 are listed in Table 2-1. There are currently 176 properties listed on the National Register.

There has been no systematic effort to make determinations of National Register eligibility for the known archaeological, historical, and architectural sites of Nevada. Current and pending listings tend to include a greater proportion of historical and architectural properties than archaeological sites, yet even for historic and architectural properties, the current listings are neither exhaustive nor representative of the total range of potentially eligible properties. Thus current National Register listings must be viewed as a small fraction of the potentially eligible properties within the State (HDR, 1980).

Table 2-1 Nevada Entries in the National Register of Historic Places

Name	Type of Entry	Date Entered
CARSON CITY		
V&T Locomotives	Objects	12-18-73
Governor Nye's Mansion	Building	4-16-75
Nevada State Capitol	Building	6-10-75
U.S. Mint	Building	9-5-75
Raycraft Ranch	Site	5-4-76
Governor's Mansion	Building	10-22-76
Virginia & Truckee Railroad Shops	Building	12-2-77
James D. Roberts House	Building	1-3-78
St. Peter's Episcopal Church	Building	1-3-78
Lakeview House	Building	1-5-78
Nevada State Printing Office	Building	3-29-78
Lew Meder House	Building	8-2-78
Carson Brewing Company	Building	8-24-78
V&T Combination Car #21	Object	12-1-78
Carson City Post Office	Building	2-9-79
G.W.G. Feeris House	Building	2-9-79
Gov. Reinhold Sadler House	Building	3-2-79
Orion Clemens House	Building	3-12-79
Ormsby-Rosser House	Building	5-17-79
Brougher Mansion	Building	8-11-80
Rickel Mansion	Building	11-20-75
Bank Saloon	Building	12-10-80
Locomotive "Glenbrook"	Object	5-1-81
St. Charles-Mullers Hotel	Building	5-27-82
CHURCHILL COUNTY		
Cold Springs	Site	2-23-72
Grimes Point	Archaeological Site	2-23-72
Stillwater Marsh	Site	3-19-75
Humboldt Cave	Archaeological Site	3-15-76
Cold Springs Pony Express Station	Site	5-16-78
Sand Springs Pony Express Station	Site	11-21-80
Ocala Cave	Archaeological Site	
Carson River Division Dam	Structure	3-25-81
Lahontan Dam and Power Station	Structure	3-25-81
CLARK COUNTY		
Las Vegas Mormon Fort	Building	2-1-72
Potosi	Site	11-13-74
Tim Springs Petroglyphs	Archaeological Site	12-16-74
Mormon Well Corral	Site	12-24-74
Sheep Mountain Ranch	District (Arch.)	12-31-74
Corn Creek Campsite	Site	3-4-75
Hidden Forest Cabin	Building	2-20-75
Kiel Ranch	Site	10-6-75

Table 2-1 Nevada Entries in the National Register of Historic Places (cont'd)

Name	Type of Entry	Date Entered
CLARK COUNTY (cont'd)		
Sandstone Ranch	District	4-2-76
Las Vegas Springs	Site	12-14-78
Sloan Petroglyphs	Archaeological Site	12-18-78
Westside School	Building	4-2-79
Tule Springs	Archaeological Site	4-20-79
Hoover Dam	Structure	4-8-81
Tule Springs Ranch	District	9-23-81
Old Boulder City Hospital	Building	4-1-82
Boulder Dam Hotel	Building	7-11-82
Brownstone Canyon	District (Arch.)	9-22-82
Pueblo Grande De Nevada	Archaeological Site	10-8-82
U.S. Post Office & Courthouse	Building	2-10-83
Boulder City Historic District	District	8-19-83
DOUGLAS COUNTY		
Genoa	District	4-16-75
Minden Flour Milling Comapny	Building	11-15-78
Carson Valley Hospital	Building	5-29-79
Lake Shore House	Building	10-4-79
Carson Valley Improvement Club Hall	Building	8-48-83
ELKO		
Ruby Valley Pony Express Station	Site	3-10-75
ESMERALDA COUNTY		
Goldfield	District	6-14-82
EUREKA COUNTY		
Eureka	District	4-13-73
Pine Valley Archaeological District	District (Arch.)	
HUMBOLDT COUNTY		
Micca House	Building	6-11-75
Last Supper Cave	Archaeological Site	12-6-75
Silver State Flour Mill	Building	5-13-76
Applegate-Lassen Trail	District	12-18-78
W. C. Record House	Building	8-27-80
Nixon Opera House	Building	5-18-83
Humboldt County Courthouse	Building	8-19-83
LANDER COUNTY		
Austin	District	11-23-71
LINCOLN COUNTY		
Bristol City	District	3-24-72
Caliente R.R. Depot	Building	3-5-74

** National Historic Landmark

Table 2-1 Nevada Entries in the National Register of Historic Places (cont'd)

Name	Type of Entry	Date Entered
LINCOLN COUNTY (cont'd)		
Black Canyon Petroglyphs	Archaeological Site	5-27-75
Pioche Courthouse	Building	2-22-78
White River Narrows	Archaeological Site	8-1-78
LYON COUNTY		
** Fort Churchill	Site	12-61
East Walker River Petroglyphs	Site	7-24-80
I. O. O. F. Building	Building	8-4-83
MINERAL COUNTY		
Aurora	District	7-30-74
Old Mineral County Courthouse	Building	1-29-82
NYE COUNTY		
Berlin	District	11-5-71
Belmont	District	6-13-72
James Wild Horse Trap	Site	11-19-74
Tybo Charcoal Ovens	Structures	11-19-74
Gatecliff Rockshelter	Archaeological Site	4-27-79
Mizpah Hotel	Building	7-7-79
Tonopah Multiple Resource District	Building	5-20-82
George A. Bartlett House	Building	
Bass Building	Building	
Cada C. Boak House	Building	
Board and Batten Cottage	Building	
Board and Batten Miners Cabin	Building	
Brann Boarding House	Building	
Brokers Exchange	Building	
Brougher-Govan Block	Building	
E. E. Burdick House	Building	
Jim Butler Mining Co. Stone Row Houses	Building	
Charles Clinton Stone Row House	Building	
Combellack Adobe Row House	Building	
Uri B. Curtis House	Building	
Samuel C. Dunham House	Building	
Frank Golden Block	Building	
John Gregovich House	Building	
Zeb Kendall House	Building	
Dr. J. R. Masterson House	Building	
Irving McDonald House	Building	
H. A. McKim Building	Building	
Nye County Courthouse	Building	
Nye County Merchantile Company	Building	
Arthur Raycraft House	Building	
Judge W. A. Sawles House	Building	

** National Historic Landmark

Table 2-1 Nevada Entries in the National Register of Historic Places (cont'd)

Name	Type of Entry	Date Entered
NYE COUNTY (cont'd)		
Tonopah Multiple Resource District (cont'd)	Building	5-20-82
Cal. Shaw Adobe Duplex	Building	
Cal Shaw Stone Row House	Building	
E. R. Shields House	Building	
St. Marks P.E. Church	Building	
State Bank and Trust Company	Building	
Stone Jail Building and Row House	Building	
Tonopah Liquor Company Building	Building	
Tonopah Mining Company Cottage	Building	
Tonopah Mining Company House	Building	
Tonopah Public Library	Building	
Tonopah Volunteer Firehouse and Gymnasium	Building	
Tonopah-Extension Mining Company Power Building	Building	
Verdi Lumber Company Buildings	Building	
Water Company of Tonopah Building	Building	
Wieland Brewery Building	Building	
Frame Cottage	Building	7-25-82
Nevada-California Power Company Substation and Auxiliary Power Building	Building	7-25-82
J. E. Smith Stone Duplex	Building	7-25-82
PERSHING COUNTY		
** Leonard Rock Shelter	Archaeological Site	1961
Ryepatch	Archaeological Site	8-2-78
Marzen House	Building	8-27-81
STOREY COUNTY		
** Virginia City	District	7-3-61
Lagomarsino	Archaeological Site	3-2-78
WASHOE COUNTY		
** Senator Newlands Mansion	Building	1961
Lake Mansion	Building	6-29-72
Morrill Hall	Building	5-17-74
Winters Ranch	Building	7-30-74
Bowers Mansion	Building	1-31-76
Mt. Rose Elementary School	Building	11-25-77
Glendale School	Building	1-30-78
Derby Dam	Structure	4-26-78
Odd Fellows Building	Building	11-27-78
Alamo Ranch House	Building	10-23-79
Hawkins House	Building	12-170-79

** National Historic Landmark

Table 2-1 Nevada Entries in the National Register of Historic Places (cont'd)

Name	Type of Entry	Date Entered
WASHOE COUNTY (cont'd)		
Rainier Brewing Co. Bottling Plant	Building	3-26-80
N.-C.-O. Railroad Depot	Building	2-8-80
Virginia Street Bridge	Structure	12-10-80
Benson Dillon Billinghurst House	Building	11-8-74
California-Nevada State Boundary Marker (1872)	Object	8-27-81
Gerlach Watertower	Structure	10-29-81
Mackay School of Mines	Building	4-1-82
George Wingfield House	Building	7-11-82
Riverside Mill Co. Flourmill	Building	8-18-82
First United Methodist Church	Building	2-24-83
Levy House	Building	2-24-83
Nortonia Boarding House	Building	2-24-83
Tyson House	Building	2-24-83
Graham House	Building	3-7-83
Humphrey House	Building	3-7-83
Twaddle Mansion	Building	3-7-83
Clifford House	Building	3-7-83
20th Century Club	Building	4-21-83
Frankovich House	Building	4-25-83
N.-C.-O. Railway Locomotive House & Machine Shop	Building	5-9-83
WHITE PINE COUNTY		
** Fort Ruby	Site	1961
Fort Schellbourne	Site	2-23-72
Ward Charcoal Ovens	Structures	9-28-71
Rhodes Cabin	Building	2-25-75
Lehman Orchard & Viaduct	Site	2-25-75
Sunshie Locality	Archaeological Site	1-30-78

** National Historic Landmark

SOURCE: Department of Conservation and Natural Resources, Division of Historic Preservation and Archaeology December, 1983.

2.2.2 Archaeological Resources

Previous archaeological research and information about the aboriginal groups that inhabited the central Nevada region for the last 11,000 years has involved both survey and excavation. Because few areas have been intensively studied, the existing data base contains numerous unavoidable gaps. Intensive sample surveys have been carried out in Big Smoky Valley (Thomas, 1977), the Reese River Valley (Thomas, 1973, Thomas and Bettinger, 1976), Grass Valley (Clawlow and Rusco, 1972), along a proposed power line in east central Nevada (Fowler et al., 1978), around all springs in the BLM Tonopah Resource Area, Battle Mountain District (McGonagle and Waski, 1978), and on portions of Nellis Air Force Range (Bergin, 1979). Nonintensive survey has been completed in east central Nevada (Fowler, 1968) and southeastern Nevada (Fowler, Madsen and Hattori, 1973). Excavations in caves and rock shelters have provided important information on chronology, material culture, and subsistence remains (e.g., Bryan, 1972; Busby, 1977; Busby and Seck, 1977; Fowler, 1968 a, b; Gruhn, 1972; Thomas, 1976; Wheeler, 1973). Several studies of petroglyph sites have also been completed (Heizer and Baumhoff, 1962; T. Thomas, 1976). Most recent work has been in the form of smallscale clearance surveys conducted on BLM lands. These studies have substantially increased the site inventory for Nevada (HDR, 1980).

Research and evidence has collectively inferred that two loci of major prehistoric importance were the spring and the pediment area in direct association with juniper-pinyon stands. Habitation sites tend to occur at these locations and site densities seem to be noticeably higher. One would expect to find clusters of sites distributed out from these loci, reflecting well-developed and defined habitation and subsistence activities centered around them (HDR, 1980).

2.2.3 Historic and Architectural Resources

Known types of cultural resources from the Historic Period are presented in this section, as directly abstracted from HDR, 1980. A useful typology of historic period sites has been developed by the BLM for its California Desert Project in the Mohave Desert. Some additional site types have been added and site distinctions made which are appropriate to the Great Basin.

For purposes of this section, historic sites are defined as loci of past activity or activities of Hispanic and Euroamerican populations. It includes sites documented in the historic record (i.e., diaries, historic accounts, and other historic documents) and sites for which no written record or reference can be found. The historic period in the study area dates back to 1776. At the other end, a site is normally considered "historic" if it is 40 years or older. However, more recent sites that have maintained historical integrity (e.g., homesteads) or are associated with a significant event or activity (e.g., WW II training camps) may also be included.

The following site types can be placed into five cultural categories which are indicative of general activities:

(1) Exploration: Exploration involves historical sites associated with early expeditions, exploration, immigrations, and government surveys.

- Exploration Route - Routes taken by early expeditions, explorers, travelers, and survey parties. Also included are routes used for domestic livestock drives. Associated campsites included.

(2) Settlement: Settlement includes those sites indicative of living activities and maintenance activities associated with settlement.

- Towns
- Hamlets
- Mining Camps
- Homesteads
- Farms
- Ranchs
- Post Offices
- Schools
- Structures (rock, adobe, wood, or a combination)
- Dug Out
- Cemetery
- Trash Dump
- Well
- Camp
- Ranching Related Features (corrals, pastures, fencelines, etc.)

(3) Military: Military encompassed remnants of past military activities.

- Fort
- Camp (1800s)
- Camp (WW II)
- Outpost
- Redoubt (small, usually temporary, enclosed defensive work).

(4) Mining: Mining is a category to cover activities specifically related to the extraction and processing of locatable, salable, and/or hard rock minerals.

- Mine
- Shaft (vertical or inclined opening).
- Adit (horizontal opening).
- Tunnel
- Arrastre (device built to grind gold-bearing quartz).
- Ore Mill

- Mining Works (e.g., flumes, chutes, sorters, etc.).

- Charcoal Processing -(site where wood is reduced to charcoal used in ore smelting).

(5) Transportation/Communication: Sites that were involved with public conveyance of passengers and/or goods, especially for a commercial enterprise, and sites involved with conveyance of information.

- Pack Trail - Historic foot and pack animal (horse and mule) route of travel that was not used by wagons.

- Wagon Road - Route habitually used by wagons pulled by draft animals.

- Stage Route - Trail utilized regularly by the stagecoach companies for handling passengers and mail.

- Stage Station - Station used regularly by stage coaches, couriers for the purposes of changing horses or draft animals and loading and unloading passengers and freight.

- Railroad - The remains of a permanent road having a line or rails fixed to tiers and laid on a roadbed or berm and providing tracks for railroad cars.

- Railroad Station

- Railroad Water Stop

- Telegraph/Telephone Line

- Automobile Road (Early)

(6) Other: Any site that is not defined by one of the above categories.

- Isolated Find - Singular occurrence of a historic artifact such as the following: Bottle, Stirrup, Horseshoe, Tin Can, Wire, Cartridge, Tool, Farm Implement, etc.

2.2.4 Cultural Chronology

The cultural resource base of east-central Nevada dates back to the Pre-Archaic period (11,000-8,000 years B.P.) and is based primarily on diagnostic projectile points from excavation sites.

2.2.4.1 Prehistoric Cultural Chronology

The Great Basin has revealed cultural remains of aboriginal life dating from 11,000 B.P. to historic times. This timespan is divided into three broad time periods and one rather brief, somewhat questionable period (Fremont). The chronological order, from oldest to youngest, is Pre-Archaic, Archaic, Fremont and Numic (Intermountain Research, 1983).

The Pre-Archaic period (11,000-8,000 B.P.) subsumes the Paleo-Indian period and Western Pluvial Lakes Tradition under one term. The early occupants of the area during this period were small bands of mobile hunter and gatherers that emphasized use of the resources in and around Pleistocene lakes and rivers. Diagnostic artifacts include fluted, concave based points; basally-ground stemmed points of the Great Basin stemmed series; and crescents or Great Basin Transverse points (Intermountain Research, 1983, from Elston 1982).

The Archaic period (8,000-750 B.P. [A.D. 1300]) is represented by a more desert-oriented way of life, probably due to a climatic change which brought widespread desiccation of the lakes and rivers. Hunting and gathering was still the subsistence mode, but more seasonal and with emphasis on small game and wild seeds. Diagnostic projectile points include Humboldt, Pinto and Elko series. About A.D. 500, towards the close of the Archaic period,

Rosegate series arrow points begin to appear and represent the replacement of the atlatl[1] with the bow and arrow (Intermountain Research, 1983).

The Fremont period existed in Utah and eastern Nevada sometime between A.D. 500 and A.D. 1200. However, the geographic extent of this culture's presence in Nevada is rather vague. In central Nevada, a small but growing number of sites have revealed sherds of Fremont pottery (Intermountain Research 1983, from Fowler 1968b, Hanes & Ball 1982; James 1981; Thomas 1982a). However, it has been pointed out that these finds are probably the result of trade with late Archaic populations rather than actual Fremont occupation (Intermountain Research 1983, from James 1981). The Fremont is characterized by sedentary horticulturists who constructed pit houses and surface storage structures of adobe and produced a well-made pottery (Intermountain Research 1983).

The Numic period (A.D. 1300 - Historic) brought yet another transition. Numic speaking groups (Shoshone, southern Paiute and northern Paiute) are believed to have migrated from the southern California area and expanded to occupy the entire Great Basin region (Intermountain Research 1983, from Lamb 1958; Bettinger and Baumhoff 1982; Madsen 1975). Diagnostic artifacts are Shoshonean Brownware pottery and Desert Side-notched and Cottonwood Triangular projectile points (Intermountain Research 1983).

When Euroamericans first entered the Great Basin area in the late 1700's, they found it occupied by Numic speakers who practiced a mobile hunting-gathering lifestyle. The central Great Basin at the time of white contact was inhabited by the Western Shoshone, a Numic-speaking people of the Uto-Aztecan linguistic family (Intermountain Research 1983, from Fowler and Fowler 1971 Steward, 1938).

---

[1] A device for throwing a spear or dart that consists of a rod or board with a projection (as a hook or throng) at the rear end to hold the weapon in place until released.

For the vicinity of Mt. Hope, however, the ethnographic picture is rather sketchy. This is probably the result of depopulation early in the historic period due to the proximity of the Pony Express and Overland Mail routes, intense mining around Eureka, and destruction of the surrounding pinyon-juniper woodland to make charcoal for the smelters (Intermountain Research 1983). Some information (Steward 1938) about the aboriginal lifeway in Pine Creek and Diamond Valley is, however, available.

Steward (1938) reported that the territory of the Pine Valley-Diamond Valley Shoshone was about 1,550 square miles. Information gathered estimated that the native population of this area numbered about 400 or a density of one person per 3.8 square miles. Previous Special Indian Commissioners Powell and Ingalls reported in 1873 that a tribe near Mineral Hill contained a total of 60 persons (Fowler and Fowler 1971).

Three winter villages were listed in the area by Steward (1938):

(a) Bauwiyoi - a group of at least six encampments at the foot of the Roberts Mountains where there are four sloughs.

(b) Tupagadu - west of the alkali flat in Diamond Valley where spring and fall festivals were held.

(c) To:dzagadu - on the western side of the Sulphur Spring Mountains. Fifteen or sixteen families (perhaps 90 individuals), scattered along the mountainside at springs a few miles apart.

The lifeway of the Western Shoshone involved a yearly cycle in which they would move from place to place within their territory as food resources became available throughout different seasons (Intermountain Research 1983). A summary of the subsistence patterns of the Western Shoshone is given by Jolly and Plog (1976) as follows: "By 4,500 B.P., these peoples had a summer camp and a winter camp from which groups would leave to hunt or gather. The area they inhabited contained several zones of vegetation: the sagebrush-grassland valley floor, the montane pinon-juniper forest, the higherelevation sagebrush zone, the virtually barren mountain tops, and the woodlands along

the river. In the sagebrush-grassland area close to water were small habitation camps where plants were gathered and processed and small-game animals like rabbits and rodents were hunted. These were probably the summer settlements, as most plants of this area matured then. At the edge of the montane belt were larger habitation camps, from which forays could be made into the valley floor and the forests. These were the winter camps, whose main subsistence activities were gathering pinyon nuts, working hides, and making clothing. Scatterings of seed knives and grinding tools at seed-collecting camps and weapons and butchering equipment at killsites suggest that these special-purpose sites were occupied for a very short time by small task groups from the summer and winter central camps. In short, the Shoshone had a dual central-based wandering system with summer and winter camps in distinctly different spots to exploit the diverse resource bases of the region." An example of this seasonal subsistence practice is accounted for by Thomas (1974) in his study of the Shoshone of the Reese River Valley of Nevada.

2.2.4.2 Historic Cultural Chronology

The history of the Great Basin can be divided into two periods: Spanish/Mexican and American.

Spanish/Mexican Period. The SpanishMexican period began in 1492 when Spain claimed the American Southwest after the discovery of the New World by Columbus, and lasted to 1848. During this period, subsequent voyages of discovery and overland explorations made by Pizarro, Cortes, Coronado and others were termed failures by the Spanish government. These expeditions had a primary objective to locate great wealth of silver and gold or land with good agricultural potential. Consequently, the region was assessed as unproductive and remained untouched for the next two centures. New Spain had pushed its frontier only as far as Santa Fe (1610).

In 1776, the Dominguez/Escalante expedition set out to open a route through Utah and Nevada and join the outposts of Monterey, California and Sante Fe, New Mexico. The expedition headed north from Santa Fe and traveled as far as Utah Lake. Discouraged by the Great Salt Lake Desert and

hardships of the trail, the party turned south and returned to known territory in early winter of 1776.

Much of the Dominguez/Escalante route became known to New Mexican entrepreneurs but no one succeeded in travelling from Sante Fe to the missions of California until American fur traders had first bridged the gap between southern Utah and southern California's Mojave River. This important event occurred in 1826-27, after political control of the region had passed from Spain to Mexico in 1821.

The central Great Basin region was first traversed during the 1820's and 1830's by fur trapping expeditions. Nevada was first crossed by a party of American fur trappers led by Jedediah Smith in 1827. Their route is generally plotted along present day Highway 6 and U.S. Route 50, south of the Mt. Hope project area (Intermountain Research 1983, from Cline 1963; Brooks 1977).

A significant expedition made by American fur trappers in 1833-34, the Bonneville-Walker party, is claimed as the first such party to make a round trip from the Great Salt Lake to the Pacific by way of the Humboldt River in Nevada (Elliott, 1973).

With the success of the Smith and Bonneville-Walker parties, exploration of the Great Basin by mountain men and fur trappers increased. However, their findings were not well documented because the men themselves were not in the habit of recording information. As commercial trade increased from Sante Fe and across Nevada via the Humboldt River (1840's and 1850's), the American government sent several U.S. military expeditions to reconnaissance the then Mexican lands of the central Great Basin and far West.

Captain John C. Fremont made five expeditions across the Great Basin and explored the Humboldt and riverless central Nevada area. His third expedition in 1845 penetrated the project area, having travelled southwest across Diamond Valley and perhaps through the Mt. Hope area into Kobeh Valley (Intermountain Research 1983, from Thomas 1982b and 1983; Welch 1981).

The Mexican Period came to an end in 1848, when the region passed into the political control of the American government. During the Spanish/Mexican Period no permanent settlements of any kind were made in the Great Basin of Nevada. The overland migration through the Great Basin during the Mexican Period started as a trickle in 1830, greatly increased by the end of the decade, and reached immense proportions during the American Period that followed.

American Period. The American Period began in 1848 with the acquisition from Mexico of the territory which Fremont had named the Great Basin. The region underwent political, social and economic changes at the very beginning of this transition. The Morman's arrival in Utah (1847) placed them as the forerunners of Anglo-American impact. In addition, the California Gold Rush of 1849 led to a significant overland emigration through the Great Basin.

Nevada's first settlement occurred at the base of the Sierra Nevada mountains, relatively well-watered country which provided forage and timber for the wagon trains prior to the mountain crossings into California. In 1850, a trading post was established at a site that later was named Genoa (HDR 1980). Within a few years, a small community had developed around the post. Many of the settlers were returnees from California who continued to prospect for gold on the eastern slopes of the mountains.

In 1854, Lt. E.G. Beckwith led a Pacific Railroad survey across the northern end of Diamond Valley by way of Railroad Pass and over the northern end of the Sulphur Springs Range through Buffey Canyon; however, the exact route taken is not certain since none of aforementioned topographic features are named in the journal (Intermountain Research 1983, from Beckwith 1855).

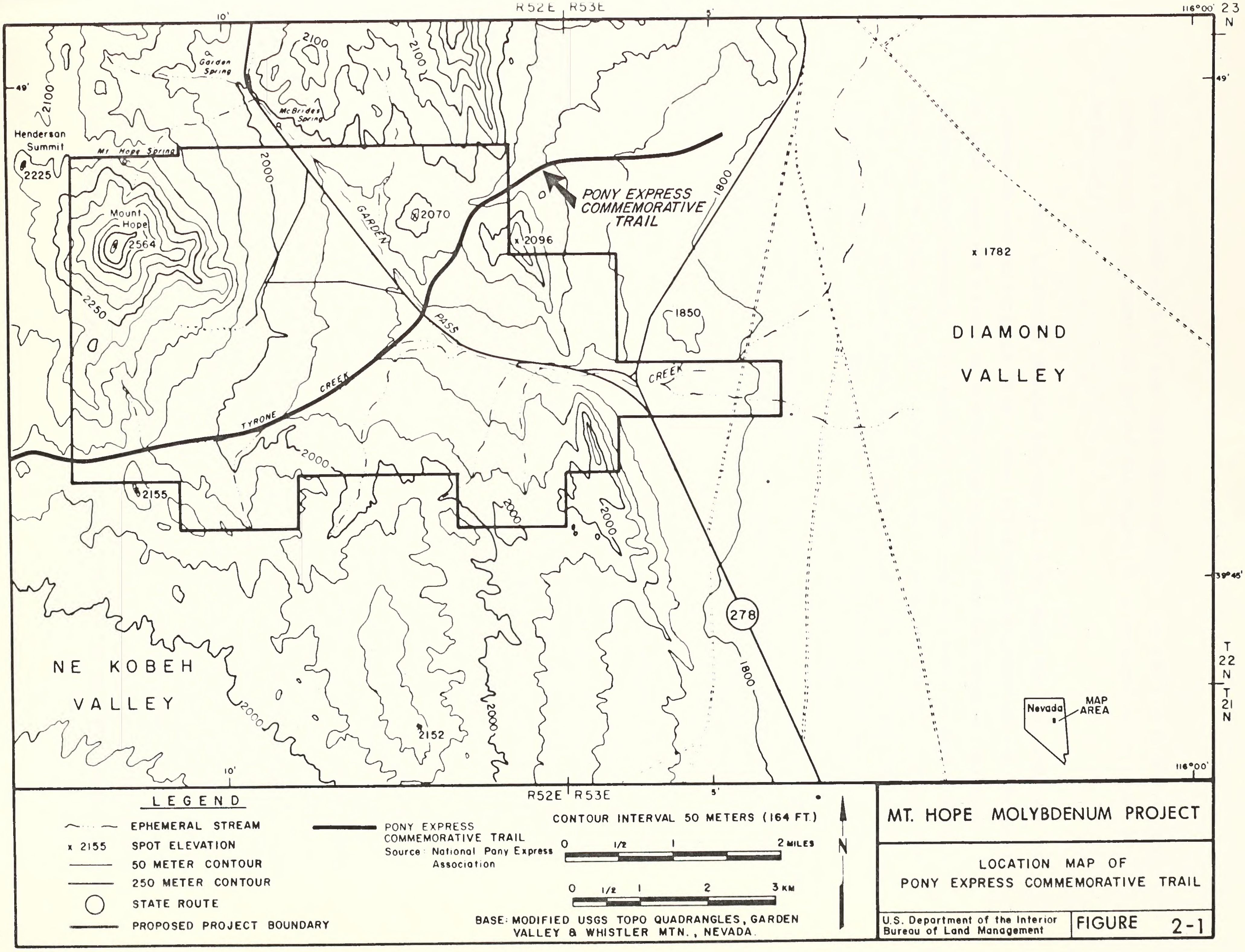
The Humboldt Trail remained as the major overland emigration route until a new passage was found across central Nevada in the mid to late 1830's. Howard Egan, a Utah resident, engaged in stock raising and marketing, pioneered a new route across the Great Basin in the mid 1850's. No significant use was made of this new, shorter route until the end of the decade, when both the postal department and the military became interested in shortening the Humboldt

River journey. In May of 1859, a military expedition led by Captain James H. Simpson (Intermountain Research 1983, from Simpson 1876) blazed a trail from Huntington Valley across the Diamond Range into Diamond Valley by way of the steep Overland Pass, south of Railroad Pass. The Pony Express and Overland Stage would later use this same pass. The Simpson party then proceeded southwest through Diamond Valley and over the Sulphur Spring Range near Garden Pass at the base of Mt. Hope, which Simpson named Cooper's Peak. In this vicinity, Simpson (1876) reported the presence of what appeared to be a game drive.

In 1859, the mail route was moved to the new central route and in 1860, Russell, Majors and Waddell's Pony Express used the Simpson or Central Route also. In the project area, the Pony Express Trail ran from northeast to southwest along the base of Mt. Hope connecting the Roberts' Creek and Diamond Springs Stations (Mason, 1976). The Pony Express was discontinued in October of 1861, due to financial losses and the completion of the transcontinental telegraph line parallel to the Central Route. Figure 2-1 illustrates the commemorative routing of the Pony Express Trail near Mt. Hope as delineated by Mr. William Arant, President, National Pony Express Association. To the extent possible, the commemorative trail attempts to duplicate, throughout its course, the most frequently used trails or areas during actual pony express rides. Due to various reasons, most particularly Indian attack threats, the trails were often varied to assure safety or speed of delivery (W. Arrant, personal communication, 1983).

The Overland Stage continued to follow the Central Route until eclipsed by the opening of the transcontinental railroad in 1869. Several stations existed along the Pony Express-Overland Stage route near the project area. The Robert's Creek and Diamond Springs Stations were constructed by the Pony Express. Another station on the route, built by the Overland Stage probably in 1863, was that of Sulphur Springs, which was between the Robert's Creek and Diamond Springs Stations (Intermountain Research 1983, from Mason 1976).

Shortly after the Gold Rush of 1849, the State of Nevada was created in boundary out of land divided between the territories of Utah and New


R52E R53E
10'
5'
116°00'
23 N
49'
2100
Garden Spring
McBrides Spring
Henderson Summit
2225
Mt Hope Spring
2000
1800
PONY EXPRESS COMMEMORATIVE TRAIL
Mount Hope
2564
2250
GARDEN
2070
x 2096
x 1782
1850
PASS
CREEK
TYRONE
CREEK
DIAMOND VALLEY
2155
39°45'
278
T 22 N
T 21 N
NE KOBEH VALLEY
2152
Nevada
MAP AREA
LEGEND
EPHEMERAL STREAM
x 2155 SPOT ELEVATION
50 METER CONTOUR
250 METER CONTOUR
STATE ROUTE
PROPOSED PROJECT BOUNDARY
PONY EXPRESS COMMEMORATIVE TRAIL
Source: National Pony Express Association
CONTOUR INTERVAL 50 METERS (164 FT.)
0 1/2 1 2 MILES
0 1/2 1 2 3 KM
N
BASE: MODIFIED USGS TOPO QUADRANGLES, GARDEN VALLEY & WHISTLER MTN., NEVADA.

MT. HOPE MOLYBDENUM PROJECT

LOCATION MAP OF
PONY EXPRESS COMMEMORATIVE TRAIL

U.S. Department of the Interior
Bureau of Land Management

FIGURE 2-1

Mexico in accordance with the Compromise of 1850. Nevada's role during the early years of the American Period was merely as a transportation route to California.

This condition changed rapidly in 1859, when the Comstock Lode was discovered around Virginia City. This silver-gold deposit and the discovery of lead, zinc and silver at Goodsprings marked the beginning of Nevada's modern mining history. California's mining boom had begun to fade and the attention of miners shifted to Nevada. As a result of the Comstock and the great increase in population, Nevada was separated from the Utah Territory by Congressional action in 1861 and received its own territorial status.

With continued growth being experienced in Nevada, statehood came in 1864 and was in part due to the Union's need for precious metals to finance the war against the Confederacy. The first ores in the Eureka area were also discovered the same year.

Development of both mine and farmlands was somewhat slow in Nevada until the completion of the Central Pacific Railroad along the Humboldt River in 1869. Many mining booms were experienced in areas that had been previously too remote from markets. Freight and stage lines then connected the mining districts with the railroad thus promoting a more accelerated development pace. Cattle and sheep raising was encouraged since cheap transportation to markets was then available.

Nevada's economy was closely tied to the natural resources of the arid region. The lifeline to mining, ranching and farming communities was water and Nevada water law quickly assumed importance. Under the conditions of statehood, the federal government retained 86% of the land as federal property and the state retained the right to dispose of water rights. Therefore, an individual could own the water rights without owning the land. This situation did not encourage the individual homesteader to take his 160 acres in Nevada since vast acreages of public land were, in essence, controlled by ranchers who owned the water rights. This condition persisted into the early 20th century until federal controls were enforced through the Taylor Grazing Act of 1924 and the establishment of the U.S. Bureau of Land Management in 1946.

Nevada's significant influx of people resulted from the state's natural mineral resource wealth. People were mostly transient, generally expecting to remain a short time for mining, and then move on to more hospitable climates. In reality, few achieved their hopes due to the difficulty of extracting, processing, and transporting the ores. The boom and bust cycle, with it's transient society, is primarily how Nevada grew. The intervals of hard times were endured by the slow growing number of small resident populations (HDR 1980).

After the Comstock boom of the 1870's, the next major boom did not occur until the early 1900's with the Tonopah-Goldfield boom. During this period, southern Nevada also became stimulated by the building of the San Pedro, Los Angeles and Salt Lake Railroads in 1950. Other lines constructed included the Tonopah and Tidewater, the Las Vegas and Tonapah, and the Bullfrog and Rhyolite, all in 1906-1907.

Nevada's population, especially the southern region, had a significant growth during the 20th century. Automobile roads linking the Great Basin with the rest of the nation were a relatively late development. The Midland Trail was the first to receive national attention, designated as a major transcontinental route in 1916 (National Midland Trail Association, 1916, rep. 1969). The route followed the old Central Nevada wagon road. In later years, much of the old Midland Trail was incorporated into the Lincoln Highway, the first paved transcontinental highway in the U.S.

During the 1920's and 1930's, Nevada benefited from a high injection of federal funds through the Bureau of Reclamation. The bureau was responsible for dam construction, engineering of water and power supply facilities, and the operation of the dams and National Recreation Area it created. Nevada's population doubled in the 1930's and continued to increase during the wartime stimulation of the 1940's and the military installations of the 1950's (Nellis Air Base, Nevada Test Site).

Today, the state's economic mainstay centers around gaming and tourism. The stability and strength of Nevada's mining industry has grown, and is the leading basic industry, followed by agriculture and manufacturing.

2.2.4.3 Cultural Chronology of Eureka and Vicinity

Eureka, like many towns of Nevada, was developed during exploitation of the mineral resources in the surrounding area. The Eureka area and Diamond Valley had been opened up by the route of the Overland Stage in 1859. The only inhabitants of the area were a few men occupying the Diamond Springs and Robert's Creek Station along the stage and Pony Express route, and the native Shoshone and Paiute Indians.

Rich ores had been discovered in Pony Canyon by William Tallcott and the Reese River Mining District was formed in 1862. This brought about the formation of Lander County in the same year. It was from the Reese River Mining District that the founders of Eureka emmigrated.

In September of 1864, a prospecting party travelled east from the then booming camp of Austin, 68 miles to the west, to explore the frontiers of Lander County. The prospectors, W. R. Tannehill, G. T. Tannehill, J. W. Stotts and Moses Wilson, discovered an ore ledge in what is now known as the New York Canyon. The location of the ore is in the vicinity of the Seventy Six mine, just south of the present Town of Eureka. The smelting methods during that time were not suited to treat the oxidized gold-silver-lead ores rich in iron that characterized the new district. In 1869, a new smelting technique was found and rich ore bodies were also discovered in Ruby Hill; Eureka subsequently became a prosperous mining district.

The year of 1869 also brought the completion of the Central Pacific Railroad, further north along the Humboldt River. The following year, Ennor and Woodruff's freight stage ran from Palisade to Eureka, and in 1871, a fast freight also opened along this route. The ensuing boom caused legislature to create Eureka County in 1873, by slicing off the eastern half of Lander County. The Town of Eureka became the county seat, claimed the largest population in central Nevada, and possessed the richest ore deposit outside the Comstock Lode at that time (Hoekenga 1983).

In November, 1873, a company was formed by Woodruff, Ennor, and three others to build a narrow gauge railroad 90 miles long between Eureka

and Palisade. After California investors took over construction in 1874, the Eureka and Palisade Railroad was completed by October, 1875 (Intermountain Research 1983, from Bancroft, 1890). Due to the fluctuations of the Eureka mines and other problems, the railroad operated on a discontinuous basis until the line was abandoned in 1983 (Intermountain Research 1983 from Myrick, 1962). This railroad connected Eureka with the main Central Pacific Railroad and the population continued to grow. Between 1871 and 1880, Eureka had a population of over 9,000 people.

Several stations were built along the railroad. Near the project area, these were from north to south, Alpha, Pine, Oak, Garden Pass, and Diamond (Intermountain Research 1983, from Myrick 1962). There was also a Mt. Hope Station located a mile east of the mining area (Intermountain Research 1983, from Vanderburg, 1938). Historic Nevada travel routes and railroads in the Eureka-Mt. Hope area are listed in Table 2-2.

The first farming in the area was associated with the raising of livestock. The grazing lands in Eureka County were homesteaded and farming and ranching industries began to establish around the springs, supplementing the mining.

During the peak of the district's production (1870's-1880's), the smelters engaged approximately 2,000 men in the production of charcoal. The ores extracted from the Richmond, Eureka, Ruby Hill and numerous smaller mines, led to extensive clearcutting of pinyon, juniper and mahogany trees from the surrounding mountainsides in order to supply the charcoal for the smelters. It was apparently in the 1890's when zinc ore was first discovered in the Mt. Hope area by Italian or Basque charcoal burners, but mine work did not begin until the 1880's.

After 1880, the major known ore bodies of Eureka were depleted and production continued on a lesser scale. With the cut in price of silver in 1890, activities were so depressed for the next 25 years that Eureka almost became deserted.

Table 2-2 Historic Nevada Travel Routes and Railroads in the Eureka - Mt. Hope Area [1]

Cole Creek - Eureka (1890 - weekly) - stage, mail route

Elko - Eureka (1880) - mail route

Ely - Eureka (1897 telephone line (1890-1904) - stage, mail route

Eureka - Belmont (1880) - mail route

Eureka - Hamilton (1870's) - stage line

Eureka - Palisade - Hamilton (1871) - fast freight, stage

Eureka - Pioche (1880) - mail route (tri-weekly)

Warm Springs - Eureka (date unknown) - stage line

Eureka and Colorado Railroad (1876)

Eureka and Palisade Railroad (1857-1938)

Eureka and Ruby Hill Railroad (or Ruby Hill RR) (1875) - mine railroad

---

SOURCE: HDR, 1980[1]

[1] Mt. Hope area includes Pony Express and Overland Trail

The Mt. Hope Mine, 23 miles north of Eureka, began operations in 1886 and has discontinuously produced zinc, lead, copper, gold and silver. Production figures are limited, but in total some $1,335,393 in ores have been extracted (Roberts et al. 1967).

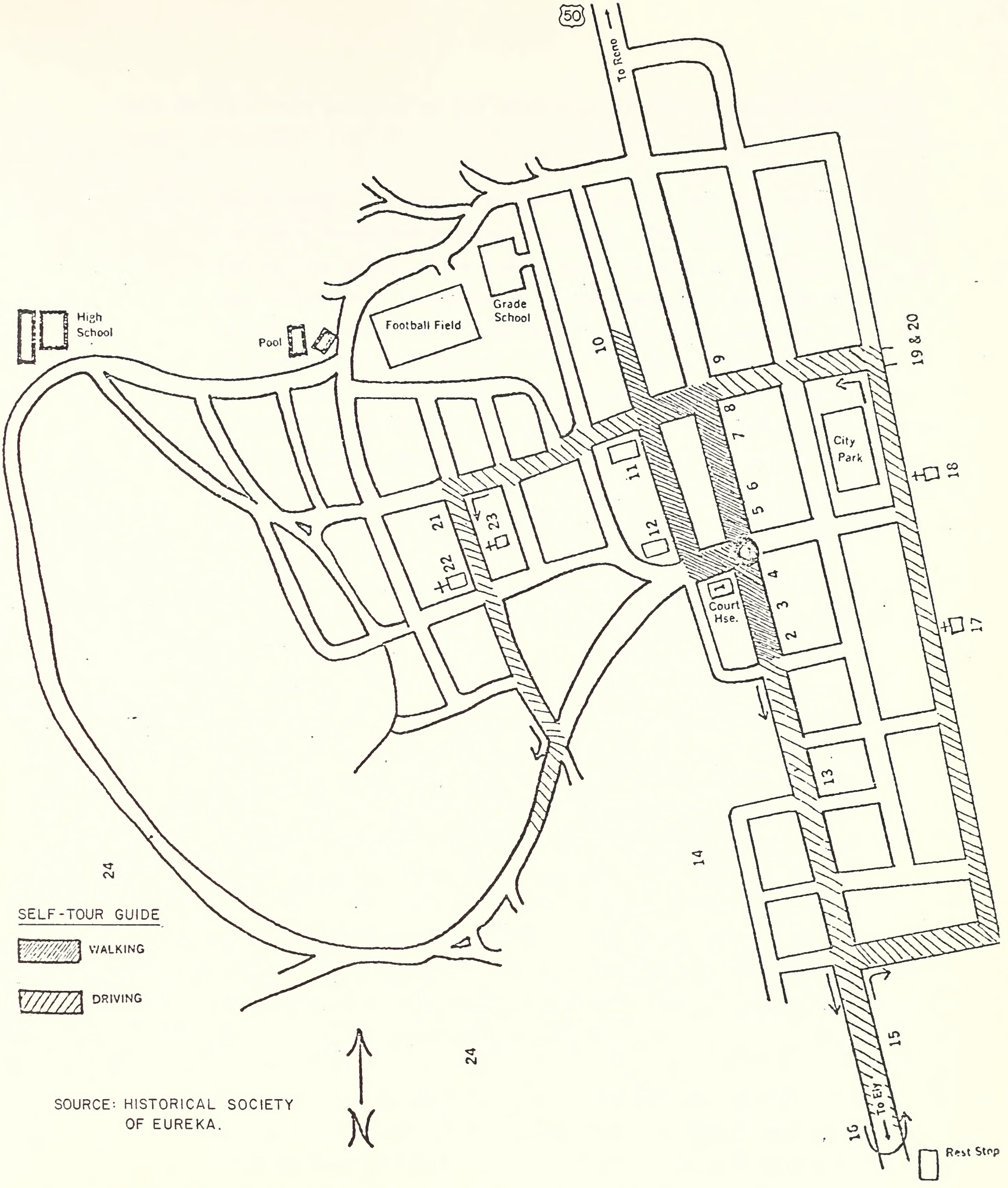
Eureka did not experience another boom until 1917, when World War I renewed activity at various mines. The Diamond-Excelsior, Holly, Windfall and Eureka-Croesus were new discoveries which enlivened Eureka up to the late 1920's.

Eureka has experienced alternating period of boom and bust up to the present. County government has helped to stabilize the Eureka Town economy with county payroll providing a significant economic input. Eureka, despite a small population, has been able to continue providing a variety of services for a large marketing area.

The hills surrounding Eureka have, to the present, produced over $100 million in lead, silver and gold. The present economy is mainly based on the government services and farming, but mining, tourism and recreation all supplement. Since 1958, there has been farming on Desert Land Entries in Diamond Valley, one of the largest farming districts in the state. Main crops in the valley include high altitude alfalfa and small grain. Most of the harvest is fed locally to beef cattle and the remainder is sold and transported outside the area. Local merchants of Eureka offer services and products to the surrounding agricultural and mining communities of Diamond Valley, Crescent Valley and Beowawe.

Eureka remains an active community with numerous historical points of interest and supports several organizations. Because of Eureka's old buildings and rich history, it was designated a National Historic District in 1976.

Figure 2-2 depicts the National Historic District of Eureka, including 24 of the many historical sites in the town (numerically keyed and listed in the following text). The legal boundaries of the District are NW corner Lat 39° 31',35", Long 115° 58',20' NE corner Lat 39° 31',35", Long 115° 57',25" SE corner Lat 39° 30,00, Long 115° 57',25", SW corner Lat 39° 30',00, Long 115° 58',20". The map and keyed descriptions (from which the following abstracts


50
To Reno
High School
Pool
Football Field
Grade School
10
9
19 & 20
8
7
City Park
11
6
5
18
21
23
12
22
4
1
Court Hse.
3
2
17
13
14
24
24
15
To Ely
16
Rest Stop
SELF-TOUR GUIDE
WALKING
DRIVING
N

SOURCE: HISTORICAL SOCIETY OF EUREKA.

FIGURE 2-2
EUREKA HISTORICAL DISTRICT

were derived) were provided by the Historical Society of Eureka and G. M. Paroni of Eureka.

1. The Courthouse was built by the contractors who also built the Opera House and Sentinel Building. The Courthouse was, and is, the pride of the Town. Built in 1879 at an approximate cost of $90,000, it was added to the older jail building which is still in use. The judges bench in the large upstairs courtroom is made of imported Spanish Cedar. The large iron doors seen on the Courthouse and throughout the Town protected the windows from fires and other damages. Several sets of iron doors around the Town are still being used and are closed each night. The two big bells in front of the Courthouse were rung as fire alarms by two of Eureka's nine volunteer companies. Each bell was identified by its tone.

2. Post Office - This brick building has been changed greatly since the early days, when it was a soda pop factory, brewery, and saloon.

3. Opera House - This building was started in 1879 as a Labor Union Hall. The Union, going on strike, ran out of funds and sold the incomplete building. It was finished as an Opera House. Jenny Lind and Frank Boothe were among the famous artists performing here. It was later converted to Silent Movies then to "Talkies". Its horseshoe shaped balcony overlooks a shock absorbing dance floor. The Opera House is silent now.

4. Brown Hotel - This hotel, built in 1877, was for many years the famous Jackson House. It was advertised as the only fireproof hotel in Nevada. Originally there was a white balcony around the second story. Jackson House was restored in 1981.

5. Brick Stores - These brick store buildings were typical of Eureka during the booming period. Eureka business houses were largely built to last of local sandstone (Tufa) or locally made brick. Many of the original buildings had brick and dirt floors for additional fire protection.

6. The Gold Bar - This is the site of one of the first banks in Eureka, called the Paxton and Company Bank. It, and half the Town, burned leaving only the original fireproof bank vault. After the 1879 fire, a new building was constructed around the old vault. This walk-in safe, complete with brass safe deposit boxes, is now a part of the old Gold Bar.

7. Fountain - This building, once a drug store, contains one of the beautiful old pressed tin ceilings. Though the ceiling has never been repainted, the colors are clear.

8. Bank Building - One of the first buildings in Eureka, made of native stones quarried locally.

9. Lodge Halls - Masonic and IOOF Buildings, which are still in use. The Masonic Temple which is underground and reportedly the only one of its kind in use.

10. Sadler House - This large two story brick house was the home of Reinhold Sadler, Governor of Nevada from 1896 to 1901. Mr. Sadler was a contract teamster, businessman, and rancher from Eureka. Until recently his descedents were Eureka County ranchers. This home is one of several in Eureka which had a tunnel to their place of business on the Main Street.

11. Colonnade Hotel - This large brick building started as the home of the Italian Benevolent Society. Upstairs were meeting rooms and downstairs, a home. The present hotel is open for business.

12. Sentinel Building - Built in 1879, this houses the original presses of the Eureka Sentinel. The building was erected after one of the Town fires burned all but the fireproof portion of the newspaper office. The inside walls of the printing room are papered with hand bills and posters from the 1880's and contains the original printing press of Eureka Sentinel, one of Nevada's oldest newspapers. It is now Eureka County's Museum.

13. Blacksmith Shop - Originally built as a blacksmith shop, tin shop, and stable.

14. White House - This private Victorian residence, known as the Zadow or Morrison house, is typical of the better homes during Eureka's heyday. Many homes of this type were burned in the fires that swept the Town. Not open to the public.

15. Smelter Stack Ditches and Slag Dumps - At one time there were 10 smelters reducing 2,000 to 3,000 tons of rich gold, silver, lead and iron ore a day from the Eureka mines. Total production from Eureka mines exceeded $100,000,000.00. The large black piles at either end of town are slag dumps produced by the smelters. During the Town's heyday there was a black cloud of smoke over the Town from the smelters. The air was so poisoned by the smoke that the Town was in danger and infant mortality was very high. Ditches were dug and pipes laid up the hill to deliver the smoke high in the air where it could be blown away by the wind. One of the ditches is still evident on the hill south of Town. Eureka, once a wooded area, was stripped of its trees to make charcoal to power the smelters. Many early immigrants, notably Italians, made a living by burning charcoal for Eureka's smelters.

16. This Log Cabin - Known as the Tannehill Cabin, is the first residence to be built in Eureka. One room cabin not open to the public.

17. Episcopal Church - This is Eureka's first permanent church built in 1871. It survivied the disasterous fires of the 1880's and remains much the same as it was built.

18. Ruined Church - This native sandstone building was originally built to be a church but was never completed for lack of funds. No trespassing allowed due to safety.

19. Assay Office - This two story brick building housed the original assay office.

20. Stone Building - This native stone building has been several things, notably a warehouse. The stone work, cut to fit without chinking is considered excellent.

21. Nob Hill Fire House - The front portion of the firehouse contained the hand drawn fire carts and the rear was a meeting place. The fire companies were social and vied with one another to put out fires and sponsor entertainments for the Town.

22. Catholic Church - The original church was built in 1871 and proved to be inadequate. The present native stone church was constructed in 1874 at a cost of $5,000.00.

23. Presbyterian Church - Organized and built in 1874. A collection was taken to provide a bell for the church. So great was the response to the collection that the extra silver was cast into the bell, giving it a unique tone. This bell is now housed in the Eureka County Museum.

24. Crossroads to Cemeteries - The six cemeteries in this area: Catholic, Masonic, Odd Fellows and Pythians, City, Chinese, Schwamb (a mortician's private cemetery), plus the Jewish cemetery south of town offer an interesting variety of nationalities who helped establish Eureka. The inscriptions on the headstones and the dates, etc. tell something of the history of the community.

CHAPTER 3.0

IMPACT ANALYSES

3.1 Introduction

The analysis of potential cultural resource impacts was conducted with an emphasis on two major criteria of effects: 1) direct physical disturbance of cultural resources in the project affected areas; and 2) the potential for impact upon the historical character of Eureka Town assuming project population influx.

Section 3.2 lists the broad assumptions and guidelines for analysis of impact. Specific assumptions of particular importance to project land resources impacts are presented in Appendix 7-A. As previously discussed, Intermountain Research, Inc. of Carson City, Nevada has conducted, under contract to EXXON and in coordination with both EXXON and BLM, extensive field and literature analyses. The results of the analyses are presently under review by the interested regulatory parties of Advisory Council on Historic Preservation (ACHP), SHPO, BLM and EXXON. Discussion pertinent to the review is presented in Section 3.2, Item 4 and Section 3.3 which also provides a brief overview summary of the investigation and analytical work conducted by Intermountain Research relative to direct physical disturbance and the significance thereof within and on the project lands. It must be emphasized, however, that Section 3.3 represents only a cursory summary and that the complete discussion of cultural resource impacts within and on project lands is presented as Appendix 7-A. A complete review of cultural resource impacts must incorporate Appendix 7-A information.

Section 3.4 presents a summary of the impact potential upon the Town of Eureka associated with the anticipated population influx of the proposed action and alternatives. Implementation of the no action alternative would negate most, if not all, of the impacts described in this Technical Report. Section 3.4.3 discusses the no action alternative.

3.2 Assumptions and Analysis Guidelines

The determination of environmental impacts upon the cultural resources base required that certain assumptions be made which would affect conclusions regarding significance of impact and nature of impact (beneficial/detrimental). The general assumptions used in the analyses are presented below. (Significant assumptions regarding physical project disturbance of historic and prehistoric resources within and on lands affected by implementation of the proposed action and alternatives are also presented in Appendix 7-A (many of which are not listed in this Section)).

1. It was assumed that the proposed action and alternatives described briefly in Chapter 1.0 of this Technical Report and in detail in Chapter 2.0 of the EIS and Technical Report No.1 would be implemented as described. Mitigation measures described in the EIS would be in place at time designated and as described. Assumptions 2 through 5 below highlight particularly important aspects of the proposed action and alternatives described, as related to cultural resources.

2. The proposed action would result in the disturbance of the following acreages of land (See Figures 1-2 through 1-5):

	Temporary
Mine Pit	700 acres
Non-Mineralized Material Storage Areas (2)	2,400 acres
Tailings Pond 4-A	3,460 acres
Evaporation Pond	164 acres
Plant Site and Auxiliaries	100 acres
Site Access Road	30 acres
Powerline 2-A (3.5 acres/mile)	77 acres
Water Line	132 acres
State Route Relocation	67 acres

Up to 200 acres of land would also be impacted by the proposed development of an employee subdivision. The impacts associated with the subdivision development relative to on-site cultural resource effects were

not evaluated because of the uncertainty of eventual subdivision siting location. It has been assumed that any purchase of public lands for such purposes would undergo similar review and protection measures for cultural resources as described for the land under consideration in this EIS and Technical Report.

The alternatives (excepting the no action alternative) would, upon implementation, result in the alternate disturbance of the following acreages of land.

Power Line 2-B	73.5 acres
Power Line 2-C	80.5 acres
Water Line 3-B	108 acres
Water Line 3-C	96 acres
Tailings Pond 4-B	5,650 acres
Tailings Pond 4-C	2,173 acres

3. Activity during construction along rights-of-way corridors would be conducted in accordance with conditions set forth by the BLM, including those pertaining to protection of cultural resources encountered.

   Most particularly, the following:

   - Clearing of the disturbed area would be kept to the least amount possible.
   - All construction access would be reviewed and approved prior to construction with existing roads and trails used wherever possible. All travel would be limited to specified overland routes unless existing roads and trails are available for use.
   - The corridor concept of route alignment would be utilized such that on-the-ground reconnaissance work could be conducted to allow modification of the actual lands routing disturbed.

4. Following BLM, EXXON and Intermountain Research coordination and review of the appended Archaeological Survey Report, the BLM has recommended that seven of eight classes of sites recorded during the two phases of field survey undergo additional evaluation, either as recommended in the report (Appendix 7-A, Cultural Resources Management Recommendations Section) or as modified below. It has been assumed that impact analyses to date represent the conclusions reported and the planning (provided below) of resource management.

   A. Middle Archaic Prehistoric Base Camps: Site EU 1011 should be subjected to further data recovery actions. Procedures would follow those specified on page 122 of the report. Sites EU 806 and EU 1040 were also considered for further work, but this consideration was dropped. Principal concern was the likelihood of indirect impacts on the sites due to their proximity to the project's western boundary. However, inaccesibility due to topographic factors and project design appears to offer sufficient deterrent toward increased numbers of people visiting the area.

   B. Middle Archaic Prehistoric Field Camps Containing Basalt Materials: The data recovery procedures stipulated in the report pertaining to site EU 788 and EU 983 (page 122 of the survey report) would be conducted.

   C. Prehistoric Pinyon Cache Site: The recommended additional work at this one site (EU 982) (see page 122 of the survey report) would be conducted.

   D. Historic Summit Station: The recommended measures for site EU 787, Feature II, specified on page 124 of the survey report would be conducted.

E. Historic Chinese Occupation Sites: The two sites (EU 787, Feature B, and EU 790) would be treated as recommended in the survey report (see pages 122 and 124).

F. Historic Charcoal Production Sites: The cluster of eight historic sites is considered of importance and would be the subject of further work (EU 923, 924, 931, 987, 988, 991, 993 and 994). However, initial data recovery procedures would be confined to sites EU 988, EU 987, and EU 924 as specified in the survey report (see page 124). Further work at any of the other six sites would be contigent on the findings from the first three sites.

G. Prehistoric Ceramic Sites: Ceramic fragments collected from site EU 986 and EU 1056 during the previous surveys would be analyzed to confirm whether it is Shoshone Brownware or some other type. No further field work would be recommended at the site.

H. Type C Prehistoric Field Camps: Further work is not warranted. Reasoning is primarily based upon the alignment of project boundaries which eliminated most of the sites from direct impact.

I. The testing and mitigation phases, as briefly described in the survey report, would be incorporated into a two-phased data recovery plan in order to present an agreed upon mitigation plan during the EIS process. The above measures stipulated for the seven classes of sites to be investigated further (A-G) would constitute the initial phase. The second phase would consist of further work at the sites deemed necessary by the results of the first phase.

5. Relative to impacts of the proposed action and alternatives upon the National Historic District of Eureka, two housing development scenarios

were considered: 1) the proposed action 5-A, a subdivision; and 2) Alternate 5-B, decentralized workforce.

The analysis was conducted by housing development scenario as 1) the provision or absence of housing was assumed to have an influence upon population dispersion and 2) siting of housing under the two cases would differ and could potentially affect the qualities of the Historic District.

Technical Report No.9 details the analysis of population and housing impacts associated with the proposed action and alternatives. The following highlights the basis of analytical results that were utilized to evaluate associated cultural impacts.

Proposed Action. EXXON would assist in the development of a 376 unit housing subdivision (household population 1087 of which 461 would be Mt. Hope employees). An additional 168 housing units located external to the subdivision would be required to house other EXXON employees (household population 122 of which 53 would be employees not living in the subdivision and the generated employment population (population of 363).

Decentralized Workforce. Alternate 5-B, the Decentralized Workforce, assumes that EXXON would not assist in the development of subdivision housing and housing of employee populations and secondarily generated employment families would be dispersed. In the Decentralized Workforce, it was assumed that a greater percentage of employees and families would reside in Carlin and Elko, as opposed to Eureka Town and vicinity. Total housing demand in Eureka was analyzed at 368 housing units for employee and secondary employment populations (versus 544 for the proposed action). The resident population would equal 1108 versus 1572 in Alternate 5-A. Remainder populations were assumed to seek housing in Elko and Carlin.

3.3 Cultural Resources of the Mt. Hope Project Area

Numerous sites designated as depicting historical background have been recorded in the project area, including the Mt. Hope Mine, Twenty Mile Shack, the Eureka Palisades Railroad and the Pony Express Trail. Other

cultural resources more distant from the Mt. Hope area but within Eureka County include the Eureka Historic District (NRHP), Pine Valley Archaeological District, Roberts Creek Station, Sulphur Springs Station, Romano Ranch, and several rock art (petroglyph) sites as reported by Heizer and Baumhoff (1962).

In addition to a Class II and Class III archaeological survey conducted in the proposed project area by Intermountain Research during 1983, over a dozen limited cultural resources surveys have been carried out in the vicinity of Mt. Hope during the last eight years. Two prehistoric sites have been recorded; a chert quarry site and a small site of five Shoshoneware sherds which were revealed by a seismic line survey in Diamond Valley. However, neither one of the sites proved significant for eligibility to the National Register of Historic Places.

The Class II cultural resources survey conducted by Intermountain Research on behalf of EXXON Minerals Company sampled ten percent of each of four areas, using random systematic transects. Sixty-five archaeological sites were observed and recorded during the survey; three of these had been previously recorded by the BLM. Fifty-two sites were discovered during the 10 percent transect sample. Of these, twenty sites were historic, twenty-nine were prehistoric and three sites had both historic and prehistoric components.

The Class III cultural resources survey conducted by Intermountain Research was of an intensive nature with the primary objective of identifying as many prehistoric and historic sites as possible within the project site. All site assessments were based on surface evidence; no subsurface digging was conducted. Surveying involved parallel transects spaced 100 ft (30 m) apart. Transects were oriented according to topographic features (drainages and ridges) as to historic features (road, railroad, etc.)

A total of 183 sites were recorded: 95 were prehistoric, 80 were historic and 8 have both periods represented. The survey results revealed that the historic sites are related to either the Eureka and Palisade Railroad, the Eureka-to-Palisade State route, or charcoal making, probably by Italian Carbonaris, of the 1870's and 1880's. Prehistoric sites are limited to field camps and task sites, probably associated with big game hunting, and

to lithic workshops where flaked stone tools were manufactured; very little evidence of seed processing was found. Most prehistoric sites were occupied during the mid-Archaic (Reveille Phase) between about 1,500 B.C. and 500 A.D., but there were later occupations as well. Only one site contained an artifact possibly attributable to the pre-Archaic period.

Both historic and prehistoric sites are restricted in distribution. Historic sites are concentrated in the mining district at Mt. Hope and along historic transportation corridors. Prehistoric sites are found in ephemeral drainages and on the terraces and ridges overlooking these drainages, and are concentrated in two portions of the proposed mine area.

Survey data suggest that most prehistoric sites in the project area are unlikely to be eligible for nomination to the National Register of Historic Places on an individual basis, although, in the aggregate, these sites have scientific and cultural significance. Some historic sites, particularly the Eureka and Palisade Railroad and associated sites, certain of the Carbonari sites, and possibly the Mt. Hope Mine, demonstrate potential for eligibility to the National Register.

Management recommendations are made for both historic and prehistoric resources. These recommendations, in addition to the entire archaeological survey performed by Intermountain Research, are presented as Appendix 7-A of this Technical Report.

Because there are no National Register properties in or near the Mt. Hope site, there would be no adverse effects to any National Register properties under the proposed action or alternatives. There is a potential for impacts to some of the sites discussed, including those that are potentially eligible for listing and must be treated as if they are listed. Within the considerations of NEPA, these impacts include possible destruction or damage during construction activities and/or burial by the tailings material.

However, because mitigating plans would have been developed and implemented in accordance with 36 CFR 800, these impacts would constitute a "no adverse effect" within National Historic Preservation Act (NHPA) considerations.

Additionally, the proposed action will require the interruption, by impoundment of tailings material, of a commemorative route traversed annually by the National Pony Express Trail Riders Association. As discussed in the EIS, a route deviation would be developed in coordination with EXXON and the National Pony Express Trail Riders Association to mitigate the proposed action and/or alternative impacts.

3.3.1 Alternatives

As alternatives to the proposed action tailings pond 4-A, which includes an area involving three prehistoric sites (two task and one workshop type sites) and two historic sites (a railroad/siding camp and debris type site), two tailings pond areas (4-B and 4-C) were investigated by Intermountain Research, Inc. Tailings pond Alternative 4-B contained a prehistoric task site type (isolate) and two historic sites (fence corral and campsite). Tailings pond Alternative 4-C contained two prehistoric task type sites and no historic type site.

As in the case of the impacts associated with the proposed action, the development and assumed implementation of mitigating plans in accordance with 36 CFR 800 would result in a determination that adverse effects to the cultural resource base within the consideration of NHPA would not occur upon implementation of either tailings pond Alternatives 4-B or 4-C.

3.3.2 No Action

Implementation of the no action alternative would preclude disturbance by project activity. Because the sites would remain in-situ there would be no adverse effects to the cultural resource base from project implementation. However, under the no action alternative the mitigation plan will not be implemented and information associated with the sites would not derive to the scientific community for an indefinite period of time. Also, the effect of such investigative/mitigative cessation on a worst-case basis, could result in unauthorized investigation or visitation (e.g. artifact hunting, vandalism, site disturbance and loss of record).

3.4 Impacts to Off-Site Cultural Resources

The population influx associated with the proposed action or alternatives would effect the broad spectrum of social and economic characteristics of the existing Eureka County and Town resident population. While some quantifiable specifity can be directed toward the analysis of such effects (e.g. acreage of land affected in the vicinity of the Eureka National Historic District), much of the characterization is limited to qualitative and professional judgement evaluations (e.g. potential for dilution of cultural background significance caused by order-of-magnitude-in-migration).

3.4.1 Proposed Action

As Figure 2-2 illustrates, the historic entities of the Eureka District are generally spaced along U.S. Route 50 as it transects the Town properties or within the block street residential matrix (church sites 22 and 23, Nob Hill Fire House site 21). Church sites 17 and 18, the assay office (No. 19), stone building (No. 20) and the cemeteries area (No. 24) lie on the extreme outskirts of the Town's road system.

As may be inferred by Figure 2-2, the eastern edge of Eureka Town buttresses steeply sloping topography which effectively has limited Town expansion to the east. Terrain to west of Town presents a lesser slope increase and fewer rock outcroppings more suitable to residential and commercial development.

Land within the downtown area and outlying street matrix is extensively developed and/or occupied (trailer homes). Acreage potentially available for sale and new development is limited to interbuilding spaces (e.g. behind the Courthouse) and outlying areas to the west and southwest of downtown. Increasingly restrictive topography and existing land uses (e.g. cemetaries, rodeo grounds) appear to effectively disperse land units into isolated parcels suitable for housing of limited acreages.

Based on the densisty of downtown land utilization, limited acreage immediately adjacent to Town (lands north and south being severely limited

primarily by topography) and a 200 acre requirement for subdivision development, it was determined that the proposed action housing subdivision would not occur within or adjacent to the Eureka Historic District. It would be feasible that some housing development by EXXON employees not residing in the subdivision and the secondary employment population also requiring housing could select the western periphery of the Town for housing construction. Additionally, lands presently occupied by trailer housing or single unit homes could conceivably be converted to multi-unit housing in response to market demands. In either case, no potential for direct destruction or residential purpose replacements was determined relative to the proposed action housing requirements and protection of the Eureka National Historic District area. Development and/or replacement of periphery housing (trailer house lots, etc.) for single unit housing or even multi-unit purposes was not determined to present significant impact, adverse or beneficial, to the Historic District. The determination was based on the relative apparent ease and availability of replacement development lots beyond the Historic District Area. In particular, the density of existing structures adjacent to historic buildings would unnecessarily require substantial costs and work efforts for housing developments relative to that required on periphery lots generally limited to temporary housing (e.g., near the high school).

As presented in Chapter 4.0 of the EIS and Technical Report No.9, the population influx of the proposed action would require the new development or expansion of some existing County/Town facilities (Sheriff's Department and County Jail). Expansion of the County Courthouse (housing jail facilities and Sheriff's Department offices) would for the most part be considered an adverse impact. While the building as a whole would most likely remain intact, with the expansion being constructed attached to the off-street back wall, the aesthetic unit quality of the structure would be affected. Prevention of such effect would require new facility construction development. Additionally, the Eureka County Elementary (grade school, Figure 2-2) School could potentially be affected if the expected expansion required by population influx were conducted in a manner affecting the buildings frontal facade. It would be expected, however, that expansion would be emphasized within available acreage areas to the west-southwest

(Molke, personal communication, 1983). Impacts from expansion to other District buildings were not identified.

The increased population resultant from implementing the proposed action would be expected to increase the potential for both the visitation and possible disturbance of cultural resource sites, both within the Historic District and within the county (sites not within the project boundaries). Increased visitation of the Historic District would be considered beneficial in that directly, monies may be generated which could be applied for additional District preservation/renovation and indirectly an appreciation of the cultural/historic values would be gained by observation, a factor potentially reducing wanton vandalism or disturbance.

3.4.2 Alternate 5-B, Decentralized Workforce

Under the Alternate 5-B case, the random housing requirements of the population influx would be expected to be fulfilled, in part, by occupancy and development of land acreage immediately within the Eureka Town area but not adjacent or as replacement to the major Historic District buildings. This determination is based on the lack of adequate acreage adjacent to the District buildings and the protection afforded these buildings by Town, County and Federal policies. Residential development would, however, be expected to occur in the vicinity of the cemetaries crossroads (Number 24 area, Figure 2-2). Such development would be representative of the evaluation that significantly more housing would be developed within the Town's periphery under the Alternate 5-B case than the proposed action subdivision case. While direct physical disturbance by residential developers would not be expected, housing sites may be located adjacent to or very near the collective cemetery area. Indirect effects (visitation, vandalism) would be expected to occur similarily to that described for the proposed action although increased negative impacts would be expected due to the higher percentage of near-located population.

As described for the proposed action, possible expansion building onto the County Courthouse and elementary school would pose adverse aesthetic effects. The potential for such development exists but would not be expected

to occur in light of the existing population's desire that the Historic District be preserved.

3.4.3 No Action

The impacts to cultural resources described under the assumption that the proposed action or alternatives would be implemented would, for the most part, not occur. Certain beneficial impacts, e.g., increased monies being generated for Historical District preservation/renovation and complete mitigative investigation of recorded prehistoric and historic site may not occur. (A decision to implement the no action alternative prior to completion of cultural resources mitigation plan has been assumed to result in the cessation of such activity as the necessity to continue would not exist.)

Correspondingly, the potential for adverse impacts brought about by increased visitation and potential vandalism would be negated relative to the proposed action or alternatives population influx.

CHAPTER 4.0
LIST OF PREPARERS

4.1 U.S. Department of the Interior, Bureau of Land Management (BLM)

ROBERTA McGONAGLE, District Archaeologist

B.A. Anthropology, University of California, Davis
M.A. Anthropology, University of California, Davis
PhD. Archaeology, University of Missouri

Experience includes eight years with Bureau of Land Management; archaeology review.

TERESA McPARLAND, Area Geologist

B.A. Geology, Stephens College, MO.

Experience includes four years experience with Bureau of Land Management; coordinator, writer-editor; geology review.

NEIL D. TALBOT, Area Manager.

B.S. Range Management, Utah State University, Logan.

Experience includes twenty years with Bureau of Land Management; team leader.

ED TILSEY, Nevada State Environmental Specialist.

B.S. Wildlife, University of Montana.

Experience includes nine years in environmental protection with Bureau of Land Management; overall document review.

4.2 Consultants

4.2.1 Wyatt Research and Consulting (WRC)

ROBERT C. WYATT, Project Manager

B.S. in Biology, University of Miami
Post Graduate Study, Biology, University of Miami

Mt. Hope Project: Responsible for coordination of environmental discipline impact analyses (except cultural resources) and direction of the third party EIS scientific team; technical and regulatory (NEPA) oversight and management of EIS documentation; and liaison and coordination with the Bureau of Land Management (BLM) and EXXON.

Experience includes management and technical analyses of environmental impact studies involving surface and underground mines, nuclear and coal-fire electrical generating plants, petrochemical and mineral process facilities, and hazardous waste/nuclear disposal site regulatory analysis. Professional experience involving activity in 23 states,

Mexico and Puerto Rico has included the technical critique and environmental discipline analysis of hydrology, air quality, chemical and mine engineering, terrestrial and aquatic biology, socioeconomics, land use, pollutant toxicity and regulatory compliance.

ALAN EASTMAN, Planner, Impact Analyst

B.A. in Geography, Mankato State University
M.A. in Urban and Regional Planning, University of Iowa

Mt. Hope Project: Assisted in the characterization and analyses of socioeconomic conditions.

Professional experience includes cost and feasibility analysis of state agency plans and projects; impact and managerial analysis of human resource service delivery entities in the areas of education, criminal justice, aged and developmentally disabled; location and economic feasibility analysis for private industry and government; and impact analysis of regional investment decisions. As a planner for more than twelve years, project activity has involved watershed assessments, urban field development (economic and social impact), recreation demand studies and transportation planning. Employment has included responsiblities as Social Services Coordinator for the Nebraska State Planning Office.

C. MICHAEL COWAN, Land Use Analyst

B.S. in Geology, University of Nebraska
M.S. in Ecology-Zoology, University of Nebraska
Ph.D in Ecology-Zoology, University of Nebraska

Mt. Hope Project: Responsible for baseline determinations and impact analyses concerning land use patterns and project plans. Assisted in technical analysis and report preparation of socioeconomic impacts.

Professional experience in excess of thirteen years has emphasized the performance and interpretation of social, economic and habitat studies relative to land use modification plans (watershed reservoir developments, mine operations, transportation systems and mineral processing facilities siting). Researched and developed the Vertically Integrated Geographic Information System (VIGIS) for the management and planning of natural and urban resources.

RANDALL K. BUSH, Geologist/Data Analyst

B.S. in Geology, University of Houston

Mt. Hope Project: Assisted in the preparation and data abstraction required for EIS technical reporting. Coordinated EIS documentation relevant to mapping and quality assurance.

Professional experience includes technical writing and regulatory compliance documentation for numerous coal and mineral mines; technical critique of topographic and geologic data and support documentation; and land use analysis (physical environmental factors relevant to engineering planning).

4.2.2 Intermountain Research, Inc.

ROBERT G. ELSTON, Archaeologist/Director of Research

B.A. in Anthropology, San Francisco State University
M.A. in Anthropology, Washington State University
Ph.D. (ABD) in Anthropology, Washington State University

Mt. Hope Project: Served as Principal Investigator for the Mt. Hope Project Class II and Class III Archaeological Survey. Additionally responsible for overall project direction and coordination of both cultural resource studies, related impact analyses, and technical report preparation. Also participated in the field work and co-authored the Class II report.

Robert Elston is an archaeologist with seventeen years experience in the prehistory of the Great Basin and desert west. He is presently Anthropologist to the College of Agriculture, University of Nevada/Reno, a quarter-time appointment. Until January 1980 when he began consulting privately through IMR, Elston was Director of the Archaeological Survey, Anthropology Department, University of Nevada/Reno. At the same time he was an associated member of the Anthropology Department faculty, curator of the Department Museum. Elston served as series editor of the Nevada Archaeological Survey Reporter. He is a SOPA member with certification in field research, collections research, archival research, and archaeological administration. Although his degrees are in anthropology and archaeology, Elston brings to his work an inter-disciplinary approach to Great Basin archaeology encompassing geomorphology, geochronology, and paleoecology. For the past ten years, Elston has developed and tested a Washoe land use model based upon the ethnographic record and is a specialist in lithic production and use-wear analysis. He has served as Principal Investigator on a variety of archaeological projects of various sizes and degrees of complexity both in Nevada and eastern California. Elston has published a number of papers, monographs, and reports on Great Basin prehistory.

CASHION CALLAWAY, Administrative Coordinator

Mt. Hope Project: Served as Project Manager and production editor for the Class II Archaeological Survey in addition to providing project and administrative management for the Class III Archaeological Survey.

Cashion Callaway has eight years archaeological experience in the history and prehistory of the Great Basin and desert west. During this time, Callaway has served on the technical staffs of Archaeological Services, Nevada State Museum; the Archaeological Survey, University of Nevada/Reno; the California Department of Parks and Recreation, Division of Archaeology; and Henningson, Durham and Richardson, Ecosciences Division. While she possesses a variety of technical skills appropriate to the field and laboratory, Callaway brings to her work a special interest in cultural resources contract management. On a day-to-day basis, Callaway functions as IMR's projects manager and contract administrator. Callaway, together with Robert Elston, organized the firm of IMR in 1979.

STEVEN R. JAMES, Staff Archaeologist

B.A. in Anthropology, University of California, Berkeley
M.A. in Anthropology, University of Utah

Mt. Hope Project: Served as Project Supervisor, providing day to day project supervision, for the Class II Archaeological Survey which he also co-authored. He also assisted in the Class II survey.

Steven James in an archaeologist with seven years experience in the history and prehistory of the Great Basin, Colorado Plateau, and California, as well as field work in Texas, Wyoming, and Hawaii. He has served as a staff archaeologist for the Bureau of Land Management Ely and Winnemucca Districts, and as a research assistant at the Desert Research Institutes, University of Nevada/Reno; the Center for Archaeological Research, University of Texas/San Antonio; and the Archaeological Center, University of Utah. James has authored numerous reports and publications including cultural resource overviews of the Ely, Elko and Salt Lake Bureau of Land Management Districts. Since joining IMR, he has directed field crews on surveys and test excavations in Nevada and California. James brings to his work a special interest in Quaternary paleoenvironmental research and faunal analysis, and aside from his other work is currently reanalyzing the Danger Cave faunal remains with Donald K. Grayson, University of Washington, through a National Science Foundation Grant.

CHARLES D. ZEIER, Staff Archaeologist

B.S. in Sociology/Anthropology, Montana State University
M.A. in Anthropology, University of Nebraska

Mt. Hope Project: Project Archaeologist and senior author of the Class III Archaeological Survey, in which he also shared the design and direction of. This involved the supervision of the cultural resources field activities and assistance in data abstraction, impact analyses and technical report preparation. He also synthesized site data for the Class II survey and assisted with various aspects of report preparation.

Charles Zeier is an archaeologist with four years experience in the Great Basin. Prior to his arrival in Nevada, Zeier worked on a variety of archaeological projects in the northern Plains while attending school at Montana State University and the University of Nebraska. In 1977, Zeier became staff archaeologist for the Nevada Division of Historic Preservation and Archaeology (SHPO) and served as alternate State Historic Preservation Officer for the State of Nevada. In 1981, Zeier joined Intermountain Research as Project Archaeologist for the White Pine Power Plant Siting Study for which he supervised the gathering of archival data, and developed evaluation criteria for plant site ranking as well as predictive model of site type and distribution.

CHAPTER 5.0
CULTURAL GLOSSARY

Alluvial fan. A fan-shaped deposit of sand, gravel and fine material dropped by a stream where its gradient lessens abruptly. Usually found at the base of highland terrain in arid regions.

Alluvium. A general term for all detrital material deposited or in transit by streams, including gravel, sand, silt, clay and all variations and mixtures of these.

Archaic. A New world cultural stage that began about 10,000 B.P. in the Southwest and about 8,000 B.P. in the Midwest and East, overlapping with and eventually succeeding the Upper Paleolithic big-game hunting traditions; characterized by the intensive seasonal foraging of localized resouces and the establishment of regularized long-distance trade. Its Old World counterpart is the Mesolithic cultural stage.

Artifacts. Things made by human hands, such as tools and shelters.

Atlatl. A spear thrower consistng of a hooked rod, with a groove into which the upper spear shaft fits, thereby increasing the range and force behind the thrust of the spear; first found in Upper Paleolithic contexts.

Band. A type of social organization involving informal leadership and small social groups.

Base camp. The main, although temporary or semi-sedentary, settlement of a social group, from which work groups set out to collect food sources. Food is divided among group members upon the return of the groups to the base.

Bifacially worked. A tool that has been produced by removing flakes from both of its sides.

Blade. A thin, parallel-sided flake whose length is usually more than twice its width. In blade manufacture, the core was first percussion flaked into a pyramid or cylinder; the blade, whose basic shape had already been formed on the core, was then struck off by either the direct or indirect (punch flaking) percussion technique.

Bolson. A basin; a depression or valley having no outlet.

Carbonari. Italian term used to describe a person who produces charcoal from the distillation of wood.

Class II cultural resource survey. A cultural resource survey conducted by sample reconnaissance of part or a percentage of the total area of investigation.

Class III cultural resource survey. A cultural resource survey involving intensive reconnaissance and identification of all cultural sites within all of the areas to be impacted.

Choppers. Crude, heavy unifacial and bifacial tools that functioned as general-purpose chopping and cutting implements.

Cleaver. Heavy, bifacial core tool with a broad, straight, sharp edge used for chopping and crushing. Made by the direct-percussion (soft-hammer) technique, the tool is characteristic of the Acheulean tradition.

Diagnostic projectile point. A sharp, pointed object that is fired, thrown or otherwise projected, such as a spear or arrowhead. Used to identify specific cultures and a defined time period.

Environmental impact. Effect of environmental loading on existing physical, biological and socioeconomic environment (e.g., change in air quality, groundwater quality or soil loss). These changes to the current or projected conditions may be beneficial, inconsequential or adverse.

Ephemeral. Lasting for a brief time, short-lived.

Fluted point. A distinctive blade tool flaked from the base along the center in order to form a groove or flute for hafting the point to a shaft.

Interglacial. Between glaciations; a period during which the glaciers receded, and the climate became warmer and moister.

Killsite. An area where game has been killed and butchered.

Lacustrine. Produced by or belonging to lakes.

Lacustrine plain. A lake basin that has become extinct by having its basin filled. This flat is covered with deposits such as are formed in lakes.

Lithic. Of or pertaining to stone, or characteristic of a specified stage in the use of stone by human beings.

Metate. A stone with concave upper surface used for grinding grain.

Midden. A dunghill or refuse heap, esp. of a primitive habitation.

Playa. The shallow central basin of a desert plain or valley in which water gathers after a rain and is evaporated. (U.S. Geol. Surv., Bull. 613, p. 184)

Pleistocene. A geological epoch lasting from 2-1/2 million years ago to about 9,000 B.P., during which large-scale glaciations covered most of the Northern Hemisphere. The Lower, Middle, and Upper Paleolithic cultural stages belong to this period.

Pluvial lakes. Lakes formed by rain water deposition or ephemeral streams; relating to former periods of abundant rains.

Porphyry. Generally referring to all rocks containing conspicuous crystals in a fine-grained groundmass. (After Holmes, A., 1920)

Punch flaking. An indirect-percussion technique, first used during the Upper Paleolithic, in which the knapper places an intermediate tool, the punch, between the hammer and the prepared core; increases knapping precision, enabling the toolmaker to produce thin, evenly chipped tools.

Rhyolite. The extrusive equivalent of a granite. The principal minerals being one or more of the silica minerals (e.g., quartz, alkali feldspar.

Rock art = petroglyphs. A carving or line drawing on rock.

Sedentism. A settlement pattern in which the social group lives in permanent, year-round villages or towns.

Shard. Also sherd. A piece of broken pottery; potsherd; a fragement of a brittle substance, as of glass or metal.

Tribe. An egalitarian social group similar to the band in its informal leadership; it differs from the band in that the family is the basic producing group.

Upper Paleolithic. A cultural stage associated with the remains of modern man, which in Europe extended from about 40,000 to 10,000 B.P. It is characterized by the blade tradition, pressure flaking, specialized big-game hunting economies, cave art, and supraband social organization.

Würm glaciation. A series of rapid glacial advances and retreates that began during the Pleistocene, about 80,000 B.P., and continued until the Recent epoch, the end of glacial times.

CHAPTER 6.0
BIBLIOGRAPHY

Arrant, William. 1983. President, National Pony Express Association (then Nevada State President). Personal communication regarding similarity of existing commemorative trail to historical trail.

Bancroft, Hubert Howe. 1890. History of Nevada, Colorado, and Wyoming, 1540-1888. The History Company, San Francisco.

Becker, Alice. 1984. Personal communication, February 21. Information on nominations of sites to the National Register of Nevada, Mt. Hope area. Department of Conservation and Natural Resources, Division of Historic Preservation and Archaeology, Carson City, Nevada.

Beckwith, Lieutenant E. G. 1855. "Report of Exploration for a Route for the Pacific Railroad on the Line of the Forty-first Parallel of North Latitude." In Explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean. Vol. II, pp. 1-132. War Department, Washington.

Bergin, Kathleen M. et al. 1979. Final Report on the 1978 Archaeological Investigations of the Nellis Air Force Bombing and Gunnery Ranges, Nye, Lincoln, and Clark Counties, Nevada, Archaeological Research Center, University of Nevada, Las Vegas.

Bettinger, Robert L., and Martin A. Baumhoff. 1982. "The Numic Spread: Great Basin Cultures in Competition." American Antiquity 47:485-503.

Brooks, George R. (editor). 1977. The Southwest Expedition of Jebediah S. Smith. The Arthur H. Clark Company, Glendale, California.

Bryan, A. L. 1972. "Summary of the Archaeology of Smith Creek and Council Hall Caves, White Pine County, Nevada, 1971 " Nevada Archaeological Survey Reporter 6(1):6-8.

Busby, Colin I. 1977. "Civa Shelter, Nye County, Nevada--Report of Test Excavations." Contributions of the University of California Archaeological Research Facility 35:81-105.

Busby, Colin I. and S. M. Seck. 1977. "Archaeological Investigations at Civa Shelter II, Lincoln County, Nevada." Nevada Archaeological Survey Reporter 10(5):1-5.

Clewlow, C. William, Jr. and M. Rusco (editors). 1972. "The Grass Valley Archaeological Project: collected papers." Nevada Archaeological Survey Research Paper 3.

Cline, Gloria Griffen. 1963. Exploring the Great Basin. University of Oklahoma Press, Norman.

Elliot, Russell R. 1939. "The Early History of White Pine County, Nevada, 1865-1887." Pacific Northwest Quarterly 30:145-168.

Elston, Robert G. 1982. "Good Times, Hard Times: Prehistoric Culture Change in the Western Great Basin." In Man and Environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. Society for American Archaeology Papers 2:186-206.

Fowler, Catherine S. and Don D. 1971. "Notes on the History of the Southern Paiutes and Western Shoshones." Utah Historical Quarterly 39:95-113.

Fowler, Don D. 1968a. "Archaeological Survey in Eastern Nevada, 1966." Desert Research Institute Publications in the Social Sciences 2.

Fowler, Don D. 1968b. "The Archaeology of Newark Cave, White Pine County, Nevada." Desert Research Institute Publications in the Social Sciences 3.

Fowler, Don D., D. B. Madsen, E. M. Hattori. 1973. "Prehistory of Southwestern Nevada." Desert Research Institute Publications in the Social Sciences 6.

Fowler, Don D. et al. 1978. "Class II Cultural Resources Field Sampling Inventory Along Proposed IPP Transmission Line Corridors, Utah-Nevada-California." Desert Research Institute Publication 72004.

Gruh, Ruth. 1972. "Excavation in Amy's Shelter, Eastern Nevada." In The Archaeology of Smith Creek Canyon, Eastern Nevada. Edited by Donald R. Tuohy and Doris L. Rendall. Nevada State Museum Anthropological Papers 17:90-160.

Hanes, Richard, and Sam Ball. 1982. "The Central Nevada Study Unit." In An Archaeological Element for the Nevada Historic Preservation Plan, edited by Margaret M. Lyneis, pp. 93-122. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Heizer, Robert F. and Martin A. Baumhoff. 1962. Prehistoric Rock Art of Nevada and Eastern California. University of California Press, Berkeley and Los Angeles.

Henningson, Durham and Richardson (HDR). 1980. Environmental Technical Report (ETR) 23, Cultural Resources. December.

Hoekenga, Marion P. 1983. A Guide to Eureka: Entertainment, Recreation, Merchants and Services.

James, Ronald M. 1983. Personal communication, December 20. Deputy State Historic Preservation Officer, Department of Historic Preservation and Archaeology, Carson City, Nevada.

James, Steven R. (editor). 1981. "Prehistory, Ethnohistory, and History of Eastern Nevada: A Cultural Resources Summary of the Elko and Ely Districts." Bureau of Land Management Nevada, Cultural Resource Series 3.

Jolly, Clifford J., and Plog, F. 1976. Physical Anthropology and Archaeology. New York: Alfred A. Knopf.

Lamb, Sydney M. 1958. "Linguistic Prehistory in the Great Basin." *International Journal of American Linguistics* 24(2):95-100.

Madsen, David B. 1975. "Dating Paiute-Shoshone Expansion in the Great Basin." *American Antiquity* 40.

Mason, Dorothy. 1976. *The Pony Express in Nevada*. Compiled by Nevada Bureau of Land Management, published by Harrah's.

McGonagle, Roberta L. and L. L. Waski. 1978. "Archaeological Survey of Springs in the Tonopah Resource Area." *Nevada BLM Technical Report* 2.

Myrick, David F. 1962. *Railroads of Nevada an Eastern California* (Vol. I). Howell-North Books, Berkeley.

Roberts, Ralph J., Kathleen M. Montgomery, and Robert E. Lehner. 1967. "Geology and Mineral Resources of Eureka County, Nevada." *Nevada Bureau of Mines Bulletin* 64.

Simpson, James H. Captain, 1876. *Report of Explorations Across the Great Basin of the Territory of Utah for a Direct Wagon-route from Camp Floyd to Genoa, in Carson Valley, in 1859*. U.S. Army, Engineer Department, Government Printing Office, Washington, D.C.

State of Nevada, Department of Conservation and Natural Resources, Division of Historic Preservation and Archaeology. 1983. Provided cultural data input.

Steward, Julian H. 1938. "Basin-Plateau Aboriginal Sociopolitical Groups." *Bureau of American Ethnology Bulletin* 120. Reprinted in 1970, University of Utah Press, Salt Lake City.

Steward, Julian H. 1941. "Culture Element Distributions: XIII. Nevada Shoshone." *University of California Anthropological Records* 4(2): 209-359.

Thomas, D. H. 1974. *Predicting the Past*. New York: Holt, Rinehart and Winston.

Thomas, David H. 1973. "An Empirical Test for Steward's Model of Great Basin Settlement Patterns." *American Antiquity* 38:155-176.

Thomas, David H. 1973. "An Empirical Test for Steward's Model of Great Basin Settlement Patterns." *American Antiquity* 38:155-176.

Thomas, David H. 1974. "An Archaeological Perspective on Shoshonean Bands." *American Anthropologist* 76:11-23.

Thomas, David H. 1976. "Preliminary Progress Report: Gatecliff Rock Shelter, Nye County, Nevada, 1975 Excavations." *Nevada Archaeological Survey Reporter* 9(1):1-4.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Thomas, David H. 1976. "Petroglyph Distribution and the Hunting Hypothesis in the Central Great Basin." *Tebiwa* 18(2):65-74.

Thomas, David H. 1977. "Preliminary Report on Archaeological Investigations at Pleistocene Lake Tonopah, Summer 1977." Carson City, Nevada State Museum.

Thomas, David H. and R. Bettinger. 1976. "Prehistoric Pinyon Ecotone Settlements of the Upper Reese River Valley, Central Nevada." *Anthropological Papers of the American Museum of Natural History* 53(3).

Vanderburg, W. O. 1938. "Reconnaissance of Mining Districts in Eureka County, Nevada." *U. S. Bureau of Mines, Information Circular* 7022.

Welch, Patrick H. 1981. "An Historic Overview of the BLM Shoshone-Eureka Resource Area, Nevada." *Bureau of Land Management Nevada, Contributions to the Study of Cultural Resources, Technical Report* 7. Reno.

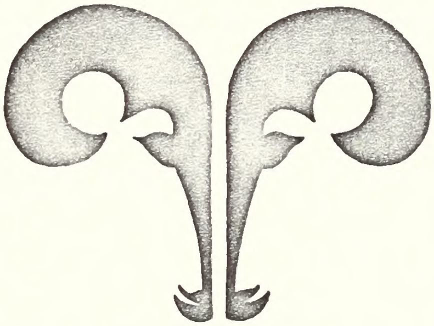
Wheeler, S. M. 1973. "The Archaeology of Etna Cave, Lincoln County, Nevada." *Desert Research Institute Publications in the Social Sciences* 7, (original 1942).

APPENDIX 7-A

A CLASS II ARCHAEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA: VOLUME I

INTERMOUNTAIN
RESEARCH

A CLASS II ARCHAEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA



REPORTS

A CLASS II ARCHAEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA

By
Steven R. James and Robert G. Elston

INTERMOUNTAIN RESEARCH
P.O. Box 32
Silver City, Nevada 89428

Prepared for

Exxon Minerals Corporation
P.O. Box 4508
Houston, Texas 77210
Contract No. 23030

June 10, 1983

ABSTRACT

A Class II cultural resources survey in a proposed 17,000 acre molybdenum mine and milling facility at Mt. Hope, Eureka County, Nevada, was conducted by Intermountain Research on behalf of Exxon Minerals Company in the spring of 1983. With the exception of the higher elevations of Mt. Hope, which were covered with snow during the field session, ten percent of each of four areas was sampled for cultural resources using random systematic transects. In addition, a proposed highway relocation route was reconnoitered, as were a few other small areas.

Sixty-five archaeological sites were observed and recorded during the survey; three of these had been previously recorded by the Bureau of Land Management. Fifty-two sites were discovered during the 10% transect sample. Of these, twenty sites were historic, twenty-nine sites were prehistoric and three sites had both historic and prehistoric components.

Historic sites are related to either the Eureka and Palisade Railroad, or to charcoal making, probably by Italian Carbonaris, of the 1870's and 1880's. Prehistoric sites are limited to field camps and task sites, probably associated with big game hunting, and to lithic workshops where flaked stone tools were manufactured; very little evidence of seed processing was found. Most prehistoric sites were occupied during the mid-Archaic between about 1500 BC and AD 500, but there were later occupations as well. No early Archaic or pre-Archaic sites were observed.

Both historic and prehistoric sites are restricted in distribution. Historic sites are concentrated in the mining district at Mt. Hope and along historic transportation corridors. Prehistoric sites are found on terraces and ridges overlooking ephemeral drainages, and are concentrated in two portions of the proposed Mine Area.

Survey data suggest that most prehistoric sites in the project area are unlikely to be eligible for nomination to the National Register of Historic Places on an individual basis, although, in the aggregate, these sites have scientific and cultural significance. Some historic sites, particularly the Eureka and Palisade Railroad and associated sites, certain of the Carbonari sites, and possibly the Mt. Hope Mine, demonstrate potential for eligiblity to the National Register.

Management recommendations are made for both historic and prehistoric resources.

TABLE OF CONTENTS

Page

ABSTRACT i

LIST OF FIGURES v

LIST OF TABLES vi

ACKNOWLEDGMENTS vii

INTRODUCTION 1

ENVIRONMENTAL SETTING 5
- Geomorphology and Geology 5
- Hydrology 6
- Climate 8
- Paleoenvironments 8
- Flora 9
- Fauna 11

PREHISTORY BACKGROUND 12
- Archaeological Research 12
- Cultural Chronology 13
- Ethnography 22

HISTORY BACKGROUND 28
- Exploration 28
- Transportation and Communication 30
- Mining and Related Developments 32

RESEARCH DESIGN 40
- Cultural Chronology 40
- Settlement and Subsistence 43
- Paleoenvironmental Change 48
- Historic Patterns 49
- Ethnic Populations 50

Page

METHODS AND TECHNIQUES 51
Pre-field Work 51
Field Work....................................... 52
Laboratory 52
Curation 56

SURVEY RESULTS 57
Mine Area.. 57
Site B... 65
Site J... 67
Area South of Mine............................... 68
Site I... 70
Highway Reroute.................................. 71
McBride's Spring................................. 72

ARTIFACT DESCRIPTIONS 73
Prehistoric Artifacts 73
Historic Artifacts 84

ANALYSIS AND CONCLUSIONS............................. 86
Site Distribution and Site Type.................. 86
Prehistoric Settlement and Subsistence........... 91
Prehistoric Cultural Chronology.................. 91
Paleoenvironmental Change........................ 93
Historic Chronology.............................. 93
Historic Site Distribution and Type.............. 95
Ethnicity of Historic Groups..................... 97
The Technology of Charcoal Production............ 98
Predictions of Historic Site Location............ 98

MANAGEMENT RECOMMENDATIONS 100

NATIVE AMERICAN CONSULTATION......................... 103

REFERENCES CITED 105

Page

APPENDIX I Archaeological Site Location Maps.............. 121

APPENDIX II Native American Consultation Correspondence.... 122

LIST OF FIGURES

Page

1. Project Vicinity Map.................................. 2

2. Project Location Map.................................. 3

3. Shoshoni Villages and Subsistence Areas in the Upper Humboldt River Region 23

4. Map of the Mount Hope Mine 36

5. Map of the Mine Area with Transect Locations........... 53

6. Map of Sites B and J with Transect Locations........... 54

7. Map of Site I with Transect Locations................. 55

8. Brush Corral at Site 26EU784 69

9. Charcoal Pit/Kiln at Site 26EU800 69

10. Projectile Points 77

11. Projectile Points 78

12. Drill, Projectile Points, Biface, and Pottery 79

13. Projectile Points..................................... 80

14. Hostetter's Bitters Bottle 85a

LIST OF TABLES

Page

1. Legal Descriptions of Areas Surveyed 4
2. Summary of Previous Cultural Resource Surveys in the Project Area 14
3. Recorded Prehistoric Sites In and Near the Project Area 16
4. Recorded Historic Sites In and Near the Project Area 17
5. Cultural Chronology for Central Nevada 19
6. Summary of Prehistoric Sites Recorded During the Survey of the Mine Area 58
7. Summary of Historic Sites Recorded During the Survey of the Mine Area 59
8. Summary of Prehistoric Sites Recorded During the Survey of Sites B, I, and J 60a
9. Summary of Historic Sites Recorded During the Survey of Sites B and J 60b
10. Summary of Sites Recorded During the Survey of the Proposed Highway Reroute 60b
11. Cultural Materials Collected From the Sites 74
12. Attributes of Projectile Points Found on the Survey 76
13. Size of Study Areas.................................... 87
14. Total Site Frequency in 10% Sample Areas............... 87
15. Frequency and Density of Prehistoric Sites in 10% Sample Areas.................................. 88
16. Prehistoric Site Types by Area......................... 89
17. Distribution of Prehistoric Sites by Culture Period.... 92
18. Distribution of Historic Sites by Time Period.......... 94
19. Frequency and Density of Historic Sites in 10% Sample Areas.................................... 95

ACKNOWLEDGMENTS

Robert G. Elston served as Principal Investigator for the Mt. Hope Project Class II Archaeological Survey. Elston contributed overall project direction, participated in the field work, and co-authored this report with Steven R. James, Project Supervisor. James provided day to day project supervision.

Field crew members were Susan Stornetta, Crew Chief, Bruce Steidl, Leslie Steidl, and Mike Trinkle. Laboratory work was conducted by Margaret Thomsen and Susan Stornetta; Stornetta prepared the artifact descriptions appearing herein. Artifact illustrations were prepared by Shelly Moore. Charles Zeier synthesized site data and assisted with various aspects of report preparation.

Eleanor Curtis and Susan Stornetta entered the text in the computer and assisted in report production. Cashion Callaway served as Project Manager and production editor.

We are grateful for the kind cooperation and assistance of Dr. Kit R. Krickenberger, Exxon Minerals Company, and Dr. Roberta McGonagle, BLM Battle Mountain District Archaeologist.

INTRODUCTION

Exxon Minerals Company (EMC) proposes to mine molybdenum ore deposits at Mt. Hope in Eureka County, Nevada. Most of the proposed mine and attendant facilities are on Federal land administered by the U. S. Department of the Interior, Bureau of Land Management, Battle Mountain District. A Class II (10% sample) cultural resources survey was conducted in accordance with BLM guidelines (BLM 1982) to develop baseline data for Exxon's Environmental Impact Report. This report describes the results of the survey conducted by Intermountain Research, Silver City, Nevada. The field work was conducted in January, April, and May 1983.

The Mt. Hope project area is located about 32 km (20 mi) northwest of Eureka on State Route 278 (Figure 1). Four loci of potential development were examined within the project area during the survey: Mine Area (which includes an open pit mine, mill site, dump sites, the preferred tailings pond, designated Site A), and three alternative tailings ponds, Sites B, I, and J (Figure 2). The Mine Area is the largest of the four loci surveyed. It is situated on the steep slopes of Mt. Hope and extends east to include a small portion of the Sulphur Spring Range and Diamond Valley. Tailings Pond Sites B and J lie south and southwest of Mt. Hope overlooking Kobeh Valley. Site I is situated east of the Mine Area in Diamond Valley. The legal descriptions and acreages of the four survey localities are given in Table 1.

The archaeological investigations for the Mt. Hope Project area were conducted in compliance with the National Historic Preservation Act of 1966 (Public Law 89-665), amended, as implemented by Section 106, 36 CFR 800, and supplementary Advisory Council on Historic Preservation guidelines; the National Environmental Policy Act of 1969 (Public Law 91-190); and Executive Order 11593, issued in 1971.

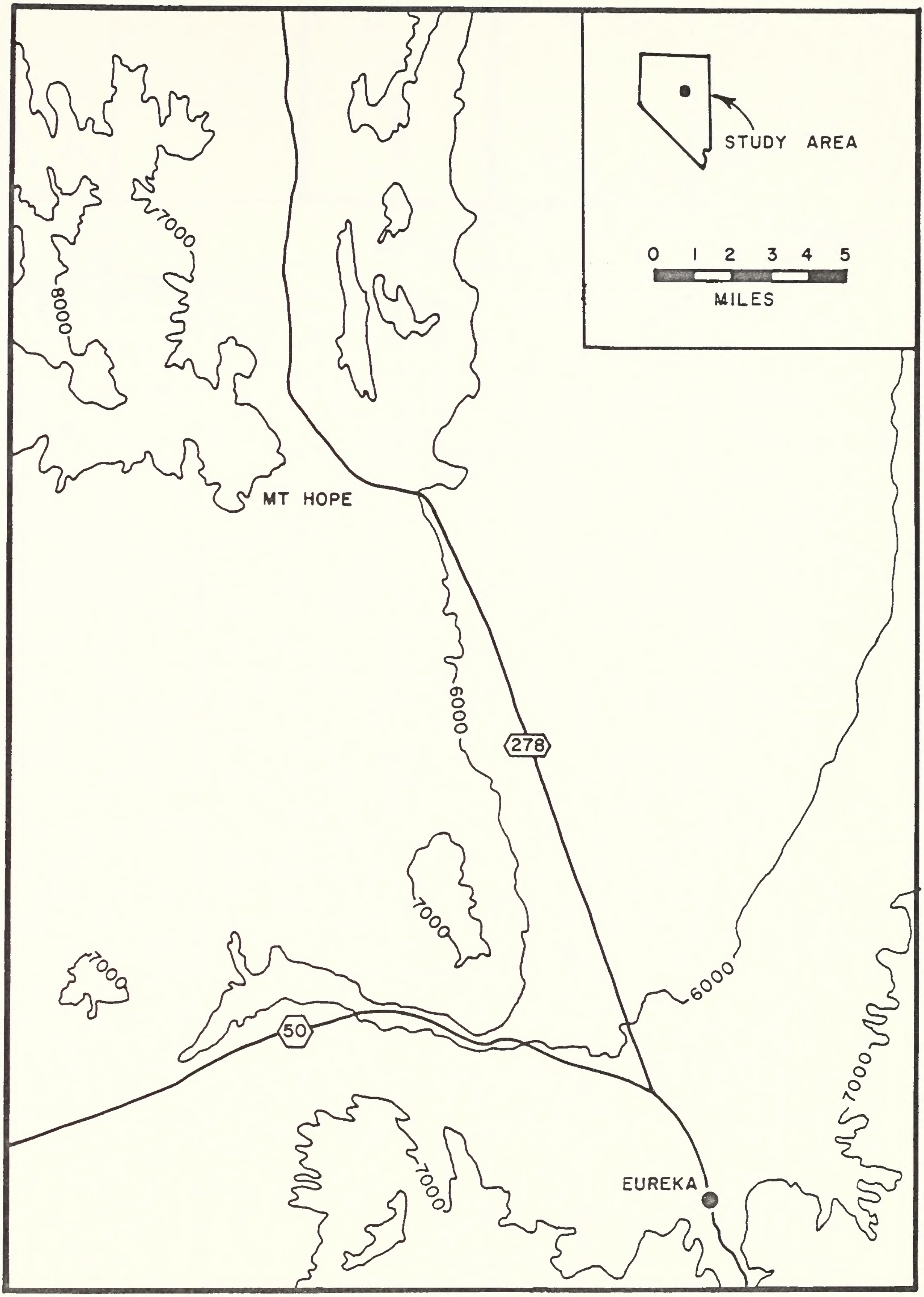

STUDY AREA
0 1 2 3 4 5
MILES
7000
8000
MT HOPE
6000
278
7000
7000
50
6000
7000
7000
EUREKA

Figure 1. Project vicinity map.

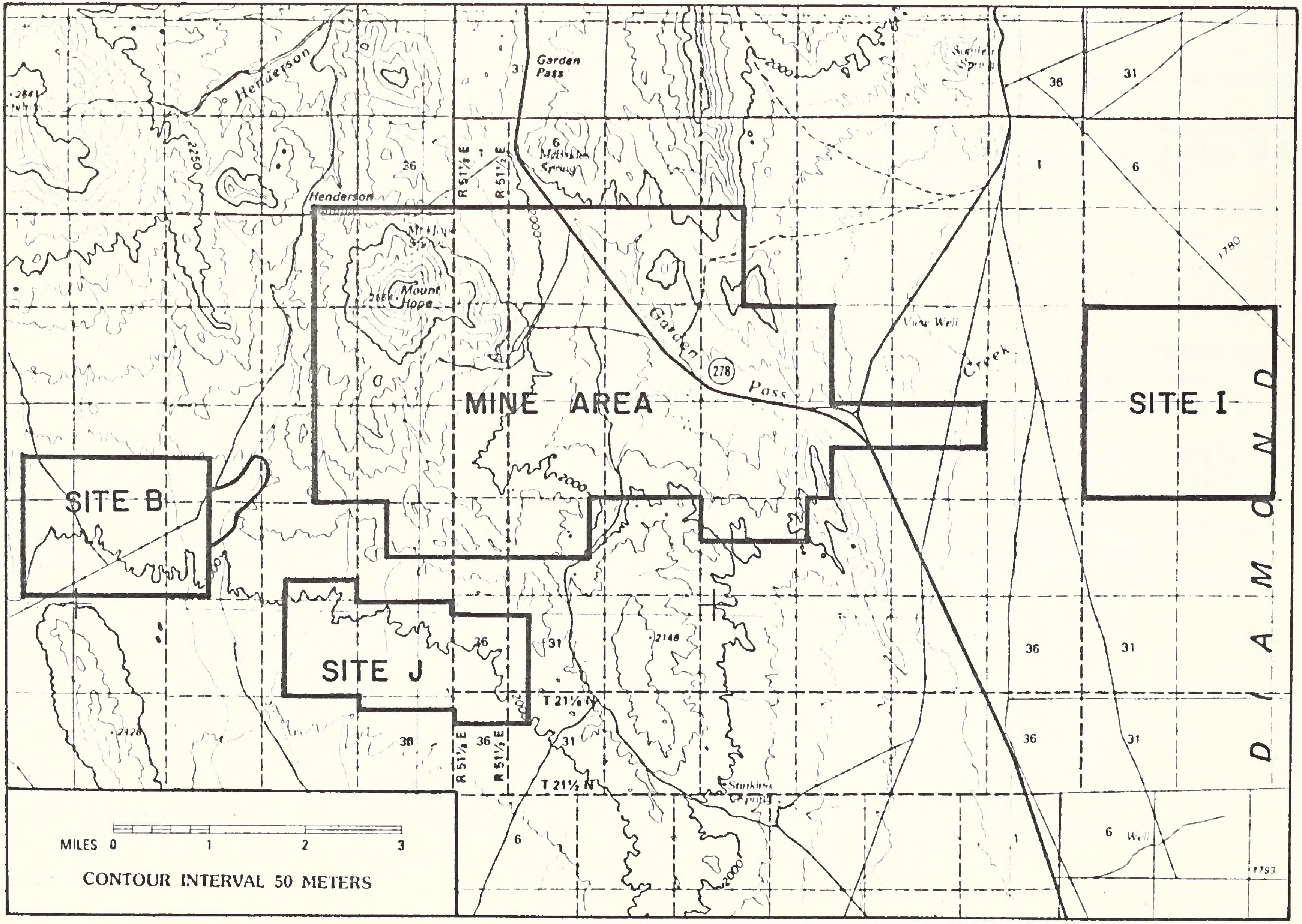

SITE I
MINE AREA
SITE B
SITE J
DIAMOND
Garden Pass
Henderson
Henderson
Mount Hope
2666
Garden Pass
278
View Well
Creek
McArthur Spring
Stinking Spring
R 51½ E
R 51¾ E
R 51⅜ E
T 21½ N
T 21¼ N
2250
2000
2148
2128
1780
1793
2841
Well
MILES 0 1 2 3
CONTOUR INTERVAL 50 METERS

Figure 2. Study Area Map

Table 1. Legal Descriptions of Areas Surveyed.

Area	Legal Description	Map Reference
Mine Area (10,560 acres)	T22N, R51E, Sec. 1, 12, 13, portions of Sec. 2, 11, 14, 24 (all unsurveyed) T22N, R51-1/2, Sec. 12, 13, 24, portion of Sec. 25 (all unsurveyed) T22N, R52E, Sec. 7, 8, 16, 17, 18, 19, 20, 21, portions of Sec. 9, 15, 22, 23, 27, 28, 30 (unsurveyed, except Sec. 22, 23)	USGS Garden Valley, Nev., 15' (1949); BLM Henderson Summit, Nev., 30' (1977)
Site B (1,920 acres)	T22N, R51E, Sec. 21, 17 SE-1/4, 20 E-1/2; unsurveyed Sec. 15 SW-1/4, 16 S-1/2, 22 W-1/2	USGS Garden Valley, Nev., 15' (1949) and Roberts Creek Mtn., Nev, 15' (1949); BLM Henderson Summit, Nev., 30' (1977)
Site I (2,560 acres)	T22N, R53E, Sec. 17, 18, 19, 20	USGS Garden valley, Nev., 15' (1949); BLM Henderson Summit, Nev., 30' (1977)
Site J (1,960 acres)	T22N, R51E, Sec. 25, portions of Sec. 23, 26, 36; T22N, R51-1/2 E, portion of Sec. 36; T22N, R52E, portion of Sec. 31; T21-1/2N, R51-1/2E, portion of Sec. 36 T21-1/2N, R52E, portion of Sec. 31 (all unsurveyed)	USGS Garden Valley, Nev., 15' (1949) and Whistler Mtn., Nev., 15' (1956); BLM Henderson summit, Nev., 30' (1977)

ENVIRONMENTAL SETTING

Geomorphology and Geology

The Mt. Hope study area is situated in the Great Basin, a part of the Basin and Range physiographic province (Fenneman 1931). The Great Basin is characterized by north-south trending mountain ranges and basins, or bolsons of internal drainage (see Peterson 1981).

The terrain within the study area is representative of the basin and range topography. Diamond Valley, a basin of internal drainage, borders the study area on the east. Garden Pass, at the extreme southern end of Garden Valley, forms the northern limits of the project area. To the west are the Roberts Mountains. Kobeh Valley lies to the south, downslope from Mt. Hope. The Sulphur Spring Range partially separates Mt. Hope and Diamond Valley.

Elevations in the study area range from about 1780 m (5840 ft) in Diamond Valley to 2564 m (8411 ft) on Mt. Hope. The lowest elevation in the nearby vicinity is 1759 m (5770 ft) on the playa in northern Diamond Valley. The highest point is Roberts Creek Mountain at 3089 m (10,133 ft).

The geology of Eureka County has been described and mapped by Roberts et al. (1967). Based on their work, the study area is composed of Ordovician chert and shale of the Vinini Formation, Lone Mountain dolomite of Silurian age, Devonian limestone of the Nevada Formation, Permian conglomerate and limestone of the Garden Valley Formation, Cretaceous or Tertiary intrusive rhyolite, and Quaternary alluvium.

The razor-back ridge of the Sulphur Spring Range that extends into the study area is primarily of the Garden Valley Formation. In this area, the Garden Valley Formation is a

reddish-brown siliceous conglomerate consisting of cemented quartzite and chert cobbles (Roberts et al. 1967:39-40). Mt. Hope and two hills to the northwest at Henderson Summit are intrusive plugs of rhyolitic porphyry (Roberts et al. 1967:48). The other rocks exposed around Mt. Hope are mostly of the Vinini Formation. Some volcanic Tertiary rocks occur farther west in the Roberts Creek Mountains.

The late Quaternary geology of the region has been studied only briefly. The little that is known indicates that a large pluvial lake filled Diamond Valley during the last Wisconsinan stage in the late Pleistocene (Hubbs and Miller 1948; Hubbs et al. 1974; Snyder et al. 1964; Mifflin and Wheat 1979). Lake Diamond, as it has been named, attained a maximum altitude of 1829 m (6000 ft), covered 1015 sq km (392 sq mi), and was at least 70 m (230 ft) deep (Mifflin and Wheat 1979:54). At its fullest extent, Lake Diamond overflowed at Railroad Pass into the Lake Lahontan System. The maximum late Pleistocene high stand of Lake Lahontan is dated about 13,000 B.P. (Davis 1982), and Lake Diamond is undoubtedly of an equivalent age.

Air photos of the project area in Diamond Valley east of the Sulphur Spring Range show many shore features of ancient Lake Diamond below 6000 feet. A prominent wave-cut terrace is cut into the rocky promontory just north of Garden Pass, and Highway 278 crosses a large gravel spit currently being mined for aggregate just to the south. Smaller gravel bars occur at lower elevations. The major terrace above Garden Pass and Tyrone Creeks appears to be graded to the high stand of Lake Diamond. Thus, most of the alluvium in the present flood plains of these streams is probably Holocene in age.

Hydrology

The location of permanent water in and near the study area would have had a pronounced effect on prehistoric and historic

settlement patterns. Aside from man-made wells, the only permanent water in the study area, as indicated on the USGS topo sheets, is to be found north of Mt. Hope at Garden, McBrides, and Mt. Hope Springs. Other springs occur beyond the limits of the study area, particularly in the Roberts Creek Mountains and along the base of the Sulphur Spring Range in Diamond Valley; several of these are hot springs. Another permanent water source in the region is Roberts Creek in the Roberts Creek Mountains. However, the creek apparently flows just a short distance before becoming an intermittent drainage as it emerges into Kobeh Valley at Roberts Creek Ranch.

Several ephemeral creeks drain the study area. Garden Pass and Tyrone Creeks drain the eastern slopes of Mt. Hope into Diamond Valley through a gap at the southern end of Sulphur Spring Range. On the west side of Mt. Hope, unnamed washes drain southward from Henderson Summit into Kobeh Valley. North of Henderson Summit and Garden Pass, Henderson Creek flows northward through Garden Valley. Although these creeks are dry throughout most of the year, there is considerable discharge during times of heavy runoff.

The lack of permanent water in much of the study area suggests that prehistoric habitation may have been limited to temporary camps. On the other hand, early explorers reported that Indians in the Great Basin dug wells in dry areas (Kern 1876) and made snow dams at dry camps in the pinyon-juniper woodland (Thomas 1983). Similar hand-dug wells could have provided water in the arid portions of the study area for the prehistoric inhabitants, but it is more likely that ephemeral water sources available at certain times of the year were used. This would have allowed occupation for several weeks or longer by small foraging groups.

Climate

The climate of the study area is considered a mid-latitude steppe under the Koppen classification (Houghton et al. 1975). Cold winters, hot summers, and semi-arid conditions are characteristic of this region. January is the coldest month; July is the warmest. At Elko, which is considerably lower than most of the study area, the mean annual temperature recorded for January is -5° C and for July, 21° C. Annual precipitation averages between 10 and 40 cm and is considerably higher in the mountain ranges. Most precipitation falls in winter as snow; occasional thunderstorms occur in the late summer months. The length of the growing season is about 100 to 120 frost-free days.

Paleoenvironments

Environmental changes of varying magnitude have occurred in the Great Basin during the late Pleistocene and Holocene. The geological and biological evidence for these environmental changes has been summarized recently by Currey and James (1982) and Davis (1982) for the eastern and western Great Basin, respectively. However, as suggested by these papers, environmental changes in these two regions are not exactly synchronous. Since Davis' (1982) summary is based in part on evidence from the central Great Basin, particularly Gatecliff Shelter, his paleoenvironmental reconstruction is presented here.

During the late Pleistocene, between 22,000 to 12,500 B.P., the climate was colder and moister than the present with winter dominate precipitation. At about 13,000 B.P., Lake Lahontan reached its maximum extent at 1335 m elevation and started falling rapidly by 12,500 B.P. Glaciers in the Sierra Nevada melted rapidly at the same time. During the Twocreekan interval (12,500 to 11,000 B.P.), Lake Lahontan continued to drop as the climate became warmer and drier than in the previous period. Within the study area, the rise and fall of Pleistocene Lake

Diamond would have been essentially synchronous with Lake Lahontan.

In the early Holocene (11,000-6900 B.P.), Lake Lahontan and other pluvial lakes in the region continued their drying trend. The end of this period is well marked by the presence of Mazama ash in various localities. The climate was cooler and moister than the present but became considerably drier by the end of the period with a change from winter to summer dominate precipitation beginning to occur. The middle Holocene (6900-3200 B.P.) is characterized by warm temperatures and moderate to low summer dominate precipitation, reaching a maximum between 5100 and 4250 B.P.

In the late Holocene from 3200 to 2000 B.P., a winter-wet climate prevailed with considerable periglacial action in places. Between 2000 to 600 B.P., the climate was generally drier with perhaps a moist interval around 1600 to 1200 B.P. From 600 to about 50 B.P., a moist, wet climate dominated the region. Since the end of the nineteenth century, the climate has been considerably drier than the preceding interval.

Flora

The flora of the region has been classified within the central Great Basin section of the Great Basin Floristic Province (Cronquist et al. 1972:77-79). Due to the nature of topographic relief in the Great Basin, several distinct vegetation zones exist within a short distance and are generally repeated from one mountain range and valley to the next throughout the region. Billings (1951) and Cronquist et al. (1972) have described each of these vegetation zones, two of which--sagebrush-grass and pinyon-juniper--occur within the project area.

The sagebrush-grass zone covers the valley floors and adjacent bajadas. As the name implies, sagebrush (*Artemisia*

tridentata) and various grasses are the dominant vegetation of this zone. This is the climax vegetation in areas receiving greater than 18 cm (7 inches) of annual precipitation (Cronquist et al. 1972:122). Other characteristic shrubs of this zone are rabbitbrush (Chrysothamnus nauseous, C. viscidiflorus), Mormon tea (Ephedra viridis), horsebrush (Tetradlymia glabrata), and spiny-hopsage (Grayia spinosa). Important bunch grasses include Agropyron spicatum, Poa sandbergii, Aristida longiseta, Elymus cinereus, Oryzopsis hymenoides, Sitanion hystrix, and Stipa comata. Common perennial forbs are balsam root (Balsamorhiza sagittata), vetches (Astragalus spp.), phlox (Phlox spp.), buckwheat (Eriogonum spp.), Indian paintbrush (Castilleja spp.), and lupine (Lupinus spp.).

The pinyon-juniper zone grows above the sagebrush-grass zone. This woodland zone occupies the slopes of the mountain ranges between 1828 and 2440 m (6000-8000 ft) where annual precipitation is greater than 30 cm (12 inches) (Cronquist et al. 1972:127). The dominant cover in the central Great Basin section consists of single-needle pinyon (Pinus monophylla) and Utah juniper (Juniperus osteosperma). Many of the taxa which occur in the sagebrush-grass zone extend into the pinyon-juniper zone. The northern limit of pinyon in this region is the Humboldt River, but juniper extends into the ranges beyond (Cronquist et al. 1972:93).

Both the sagebrush and pinyon-juniper zones have undergone considerable change within the last century. As a result of significant land disturbances (e.g., deliberate burning, cultivation, grazing, and construction activities), several introduced alien plants invaded and rapidly spread throughout the region, particularly in sagebrush communities (Currey and James 1982:45; Young et al. 1972; Yensen 1981). The alien species include cheatgrass (Bromus tectorum), Russian thistle (Salsola kali), halogeton (Halogeton glomeratus), tansy mustard (Descurainia sophia), and tumble mustard (Sisymbrium

altissimum). Most of these plants invaded around the turn of the century. Halogetan may have arrived in the region as late as 1930. Since that time, it has spread rapidly and now even forms separate communities.

The major impact on the pinyon-juniper community was the historic cutting of the trees to make charcoal for the smelters in mining areas such as Eureka (Young and Budy 1979). As testimony to this activity, axecut stumps were observed on the survey throughout the project area around Mt. Hope. For the most part, the pinyon-juniper woodland has come back and has even invaded the sagebrush community in some ranges.

Fauna

The mammalian fauna of Nevada are thoroughly described by Hall (1946). The avifauna of the region are listed in Linsdale (1936); LaRivers (1962) describes the fishes. Data on reptiles and amphibians are contained in several sources (Linsdale 1940; Stebbins 1966). A complete listing of the fauna in the study area is not presented here. One aspect of the area fauna which bears on prehistoric utilization of the area concerns the changes that have occurred in the distribution of game animals.

During the historic period, several mammalian taxa in the region were extirpated. These include wolf (*Canis lupus*), grizzly bear (*Ursus horribilis*), elk (*Cervus canadensis*), bison (*Bison bison*), and bighorn sheep (*Ovis canadensis*) (Currey and James 1982:43; Grayson 1982; Hall 1961). An exception to this is in the southern Toiyabe Range where bighorn sheep have survived to the present (Barrett 1965; McColm 1963). Elk and bighorn sheep have been reintroduced in other areas of eastern and central Nevada. Another faunal change involves that of mule deer (*Odocoileus hemionus*) which have increased considerably since the early historic period (Currey and James 1982:43; Grayson 1982).

PREHISTORY BACKGROUND

Archaeological Research

Archaeological investigations in eastern and central Nevada have been summarized recently in several papers (Hanes and Ball 1982; James 1981; James and Zeier 1982; Thomas 1982a). For that reason, only a brief synthesis of the research is presented here.

As Thomas (1982a) has pointed out, the archaeological potential of the region was largely ignored until the mid-1960s. At that time, Fowler (1968a) conducted a major survey throughout various portions of eastern Nevada including Newark Valley east of Mt. Hope; Newark Cave was excavated during the survey (Fowler 1968b).

In 1968, to the southwest of the Mt. Hope area, Thomas (1971, 1973, 1979, 1981a, 1982a, 1982b, 1983; Thomas and Bettinger 1976) initiated a long-term research program of survey and excavation in Reese River Valley, Monitor Valley and the surrounding Toiyabe and Toquima Ranges. Further south, Thomas and his associates have investigated the Paleoindian potential of Big Smoky Valley, formerly part of Pleistocene Lake Tonopah (Kelly 1978; Pendleton 1979; Thomas 1979:293-294).

A considerable amount of work has been undertaken in Grass Valley, which lies to the west of Mt. Hope. Clewlow and others have surveyed, collected, and excavated a number of sites at the southern end of the valley, including several historic period Shoshoni villages (Clewlow and Rusco 1972; Clewlow et al. 1978; Beaudry 1979; Bouey 1979; Beck 1981). Earlier, Magee (1964, 1966, 1967) reported on Shoshoni ceramics from this area. In the northern end of Grass Valley, Elston and his students (1980a, 1980b; personal communication 1983) have made an intensive site survey and collection of several sites, one of which is a large pre-Archaic basalt scatter. In the past several years,

investigations at the historic mining town of Cortez in the extreme northern end of the valley have been undertaken by Hardesty and Hattori (1982).

North of Mt. Hope, surveys and excavations have been carried out in several areas, including Pine Valley (Stearns, Steinberg, and Turner 1978; Turner, Stearns, and Turner 1979; McGuire 1980); Bronco Charlie Cave in the Ruby Mountains and Ruby Valley (Casjens 1974); and South Fork Shelter (Heizer et al. 1968) and Carlin Basin Area Sites (Rusco et al. 1979) along the Humboldt River.

Several rock art sites have been reported from central Nevada in Eureka and Lander Counties (Heizer and Baumhoff 1962; Thomas 1976; Thomas and Thomas 1972). Data on rock art sites in eastern Nevada are contained in Heizer and Baumhoff (1962) and James (1981).

In the vicinity of the project area, over a dozen limited cultural resource surveys have been carried out over the past eight years (Tables 2 through 4). One seismic line survey yielded a small site (CRNV-06-2819), consisting of five Shoshonean pottery sherds; this site is located in one of our present survey areas, Site I. The only other previously recorded prehistoric site in the project area is a chert quarry (CRNV-06-2682) situated in Site B. Historic sites recorded within the survey areas are the Mt. Hope Mine (CRNV-06-2140), Twenty Mile Shack (CRNV-06-1051), the Eureka and Palisades Railroad (CRNV-06-1235), Site CRNV-06-2348, and the Pony Express Trail (CRNV-06-482).

Cultural Chronology

Archaeological research in the Great Basin over the past several decades confirms that the prehistoric cultural chronology can be divided into three broad time periods: Pre-Archaic (9000 B.C.-6000 B.C.), Archaic (6000 B.C.-A.D. 1300), and Numic (A.D.

Table 2. Summary of Previous Cultural Resource Surveys in the Project Area.

BLM CR Rept. No.	Project Description*	Sites Recorded*	Reference
6-31	Bell Telephone underground right-of-way along Highway 20	None	Nodine(1975)
6-40	Mt. Hope Mine powerline and pipeline	None	McGonagle(1976)
6-132	Eureka Community borrow pit	CRNV-06-1235	Welch(1978a)
6-160-1	FY 77 exclosures	CRNV-06-1219	Welch(1978b)
6-203-2	Soil test pits in Roberts Mountains	None	Crabtree(1979)
6-263	Eureka County gravel pits	None	Brecheisen(1980)
6-274	Several seismic lines in Kobeh Valley	None	Westec Services (1980)
6-277	Geotechnical studies	None	Fugro Northwest (1980)
6-316	MX quadrat sampling survey	26EU345, EU349, EU358, EU359	Busby and Kobori (1980)
6-352	Geotechnical studies	CRNV-06-2682	Ertec Northwest (1981)
6-364	Seismic lines in Diamond Valley	CRNV-06-2815 to 2819	Robinson(1981)

*Refers to work conducted in vicinity of Mt. Hope only.

Table 2. (Continued).

BLM CR Rept. No.	Project Description*	Sites Recorded*	Reference
6-406	Garden Pass-Alpha fence	Revisited CRNV-06-1075,1235,1854,1855	Crabtree(1981a)
6-413	Seismic lines in Diamond Valley	None	Robinson(1981b)
6-414	Mt. Hope proposed road	None	McParland(1981)
6-429	Historic sites inventory	Roberts Creek Station (CRNV-06-2139); Mt. Hope Mine(2140); Sulphur Spring Station(2143); Romano Ranch(2146)	-----
6-103, 6-522	BLM Eureka Spring Survey, 1979-1982	CRNV-04-1288,1372 to 1378, 1380 to 1382 1403 to 1405, 1442 to 1445, 1486, 1487 1804, 1850, 1853, 2926, 2934, 2954, 2955	No report available
6-533	Roberts Mountain exclosure	CRNV-63-2948 to 2950	Crabtree (1982)

*Refers to work conducted in vicinity of Mt. Hope only.

Table 3. Recorded Prehistoric Sites in and near the Project Area.

BLM Site No.	Site Name	Elevation	Site Type	Artifacts
1403*	McBrides Spring	6520	lithic scatter	metates, manos, pestle, hammerstones
1404	Garden Spring	6700	lithic scatter	metates, manos, biface, Shoshonean ceramics, hammerstone
1405	Mt. Hope Spring	7200	lithic scatter	bifaces, unfinished point
1444	Stinking Spring No. 2	6330	lithic scatter	Humboldt point, biface
2682*	-----	6600	quarry	cores
2819	-----	5850	pottery scatter	Shoshonean ceramics
2954	-----	6955	lithic scatter	Elko series point, incised stone, bifaces, scraper, core
2955	-----	7170	lithic scatter	Elko series point, bifaces

* Re-recorded during present survey

Table 4. Recorded Historic Sites in and near the Project Area.

BLM Site No.	Site Name	Site Type/Activity	Remains
482	Pony Express Trail	trail	
1051	20 Mile Shack	habitation	structure of railroad ties
1235	Eureka-Palisade RR	railroad	grade, ties, trestles, wooden culverts, associated trash debris
1443	Stinking Spring No. 1	habitation, mining	masonry structure, mine tunnels
1445*	None	charcoal burning camp	charcoal pits, corrals, cans
2139	Roberts Creek Ranch	Pony Express Station	
2140	Mount Hope Mine	mining	associated mining structures and debris
2143	Sulphur Spring Station	Overland Stage Station	
2348	None	Unknown	Unknown

* Re-recorded during present survey

1300-historic contact, A.D. 1850) (Table 5). The evidence for this chronology is based largely on diagnostic projectile point types which have been recovered from dated stratigraphic levels in excavated sites (see Heizer and Hester 1978; Thomas 1970, 1981b). Thus, projectile points found on surface sites can be correlated with the dated point types to establish the age of the surface sites.

A fourth time period, or culture, known as the Fremont existed in Utah and eastern Nevada between about A.D. 500 and A.D. 1200. The Fremont, for the most part, were sedentary horticulturalists who constructed pit houses and surface storage structures of adobe and produced a well-made pottery. In central Nevada, the Fremont are represented by pottery sherds at a small but growing number of sites (Fowler 1968b:23; Hanes and Ball 1982:104; James 1981:137; Thomas 1982a:161). Fremont sherds in this area are probably the result of trade or exchange with late Archaic populations rather than actual Fremont occupation (James 1981:136). Our understanding of Fremont-Archaic and/or Fremont-Numic interaction in this region is very limited and no discussion of it is presented here.

Pre-Archaic (9000 B.C.-6000 B.C.). The pre-Archaic period subsumes the Paleoindian period and Western Pluvial Lakes Tradition. Elston (1982:191-192) recently has summarized the lithic technology of the pre-Archaic for the western Great Basin, and his discussion is applicable to the Great Basin as a whole. Diagnostic artifacts are fluted, concave based points; basally-ground stemmed points of the Great Basin Stemmed series; and crescents or Great Basin Transverse points. Other tools include "beaked gravers or spurs, punches, scraper planes, steep-edge side and end scrapers, spokeshaves, choppers, and small flake tools" (Elston 1982:192). Many of the tools and points are worn and resharpened suggesting a high degree of curation among pre-Archaic peoples. The pre-Archaic lifeway appears to have been based on the hunting of big game by a small, highly mobile

Table 5. Cultural Chronology for Central Nevada (Modified from Thomas 1983:Table 7; Davis 1982:Table 2).

Period	Phase	Age	Diagnostics	Climate
Historic		A.D. 1850-1930	Various historic debris--e.g., hole-in-top cans, 3 piece mold bottles, Chinese ceramics	
Numic	Yankee Blade	A.D. 1300-1850	Desert Side-notched and Cottonwood series points, Shoshonean ceramics	Late Holocene; moderate winter precipitation
	Underdown	A.D. 500-1300	Eastgate and Rose Spring (Rosegate) series points	Late Holocene; low effective precipitation
Archaic	Reveille	1000 B.C.-A.D. 500	Elko series points	Late Holocene; moderate winter (and summer?) precipitation
	Devils Gate	3000 B.C.-1000 B.C.	Pinto series and Humboldt Concave Base A points	Middle Holocene; very low winter (?) precipitation, followed by moderate summer and winter precipitation
	-----	6000 B.C.-3000 B.C.	Northern Side-notched points stemmed and concave base points	Middle Holocene; moderate summer precipitation
Pre-Archaic	-----	9000 B.C.-6000 B.C.	Great Basin Stemmed series and Paleoindian points; crescents	Early Holocene; high effective winter precipitation but decreasing

population, though some lacustrine subsistence adaptations are also suggested.

The evidence for the pre-Archaic period throughout the Great Basin is represented by surface finds for the most part. In the central Great Basin, the period is represented so sparsely that Thomas (1982a) barely acknowledges its existence in his recent review. Nevertheless, there are several sites in the region that contain pre-Archaic materials, some of which have been discovered only recently. In Grass Valley, one large site (known as "It's Earlier Than You Think") yielded numerous basalt tools and stemmed points (R.G. Elston, personal communication, 1983). From Newark Cave, what appears to be a stemmed point (although classified as a blade) is in the collection (Fowler 1968b:Plate 3c). Numerous pre-Archaic projectile points have been reported from the Sunshine Locality in Long Valley (Tadlock 1966; York 1974, 1978), and several stemmed points have been recovered from Jakes Valley (James and Zeier 1981).

Archaic (6000 B.C.-A.D. 1300). Sometime after 8000 years B.P., a seasonal hunting and gathering lifeway emerged in the Great Basin. Whether the Archaic pattern evolved out of the pre-Archaic or represents a replacement by a different population is not known. In some parts of the region, the Archaic lifeway was similar to the ethnographic pattern described by Steward (1938) for the Western Shoshoni of the central Great Basin. In other areas, there was much more diversity in terms of settlement and subsistence patterns to the point that semi-permanent or permanent occupation may have been possible (e.g., see Elston 1982).

In contrast to the earlier pre-Archaic, Archaic period sites are well-represented in the region and need not be listed specifically. Diagnostic projectile points of the Archaic period include the Humboldt, Pinto, and Elko series. Toward the end of the Archaic period, about A.D. 500, smaller Rosegate series

points appear in the archaeological record which indicates the replacement of the atlatl with the bow and arrow. The most complete Archaic sequence is provided by Thomas' work at Gatecliff Shelter in the Toquima Range, as well as his other research in the Reese River and Monitor Valleys (Thomas 1971, 1979:173-177, 1981a, 1982; Thomas and Bettinger 1976). A less detailed cultural sequence is represented in Grass Valley (Clewlow and Pastron 1972; Elston 1980a).

Numic (A.D. 1300-1850). Between about A.D. 1000 and A.D. 1300, the Numic-speaking Shoshoni, southern Paiute, and northern Paiute are believed by some to have migrated in a northeastern direction across the Great Basin from an area near Death Valley. This supposed migration is based largely on linguistic models (Lamb 1958) and possibly some archaeological evidence (Bettinger and Baumhoff 1982; Madsen 1975; 1982:219-221). The question of whether or not there was an actual migration remains to be demonstrated adequately. The best attempt to explain the Numic spread is by Bettinger and Baumhoff (1982), who used an optimal foraging model; their arguments are far from conclusive, however.

Regardless of whether or not there was a migration, Numic occupations are represented in the Great Basin by several diagnostic artifacts, the most distinctive of which is Shoshonean brownware pottery. Desert Side-notched and Cottonwood Triangular projectile points, also diagnostic artifacts, are not exclusively Shoshonean items.

Various archaeological sites containing Shoshonean pottery and Desert Series points are reported in this region. In Grass Valley, Shoshonean sherds from nearly 60 sites have been recovered and analyzed (Beck 1981). Shoshonean sites of the historic period in Grass Valley have also been studied (Clewlow and Rusco 1972; Clewlow et al. 1978). Other sites containing Shoshonean artifacts include those in Monitor and Reese River Valleys and Alta Toquima Village on Mt. Jefferson (Thomas and

Bettinger 1976; Thomas 1981b, 1982a, 1982b), Newark Cave (Fowler 1968b), and Bronco Charlie Cave (Casjens 1974).

Ethnography

At the time of white contact, the central Great Basin was inhabited by the Western Shoshoni, a Numic-speaking people of the Uto-Aztecan linguistic family (cf. Fowler and Fowler 1971:5-6; Steward 1938). The major source of information on the Western Shoshoni is Julian Steward's (1938) seminal ethnographic work.

For the vicinity of Mt. Hope, however, the ethnographic picture is rather sketchy. This is probably the result of depopulation early in the historic period due to the proximity of the Pony Express and Overland Mail routes, intense mining around Eureka, and destruction of the surrounding pinyon-juniper woodland to make charcoal for the smelters. Nevertheless, Steward (1938:141-143) provides enough information for us to have some idea of the aboriginal lifeway in Pine Creek and Diamond Valley.

Territory and Population. Steward (1938:141) reported that the territory of the Pine Valley-Diamond Valley Shoshoni was about 1550 square miles. The informant Steward interviewed [SF--a Shoshoni man born about 1865 at Mineral Hill (Steward 1941:214)] estimated that the native population of this area numbered about 400 or a density of one person per 3.8 square miles (Steward considered this estimate to be too high). Earlier, Special Indian Commissioners Powell and Ingalls reported in 1873 that a tribe near Mineral Hill under Chief Tu'-Ka-yan-na contained a total of 60 persons: 24 males, 21 females, and 15 children under age 10 (Fowler and Fowler 1971:105).

Three winter villages in the area were listed by Steward (1938:141-142; see Figure 3):

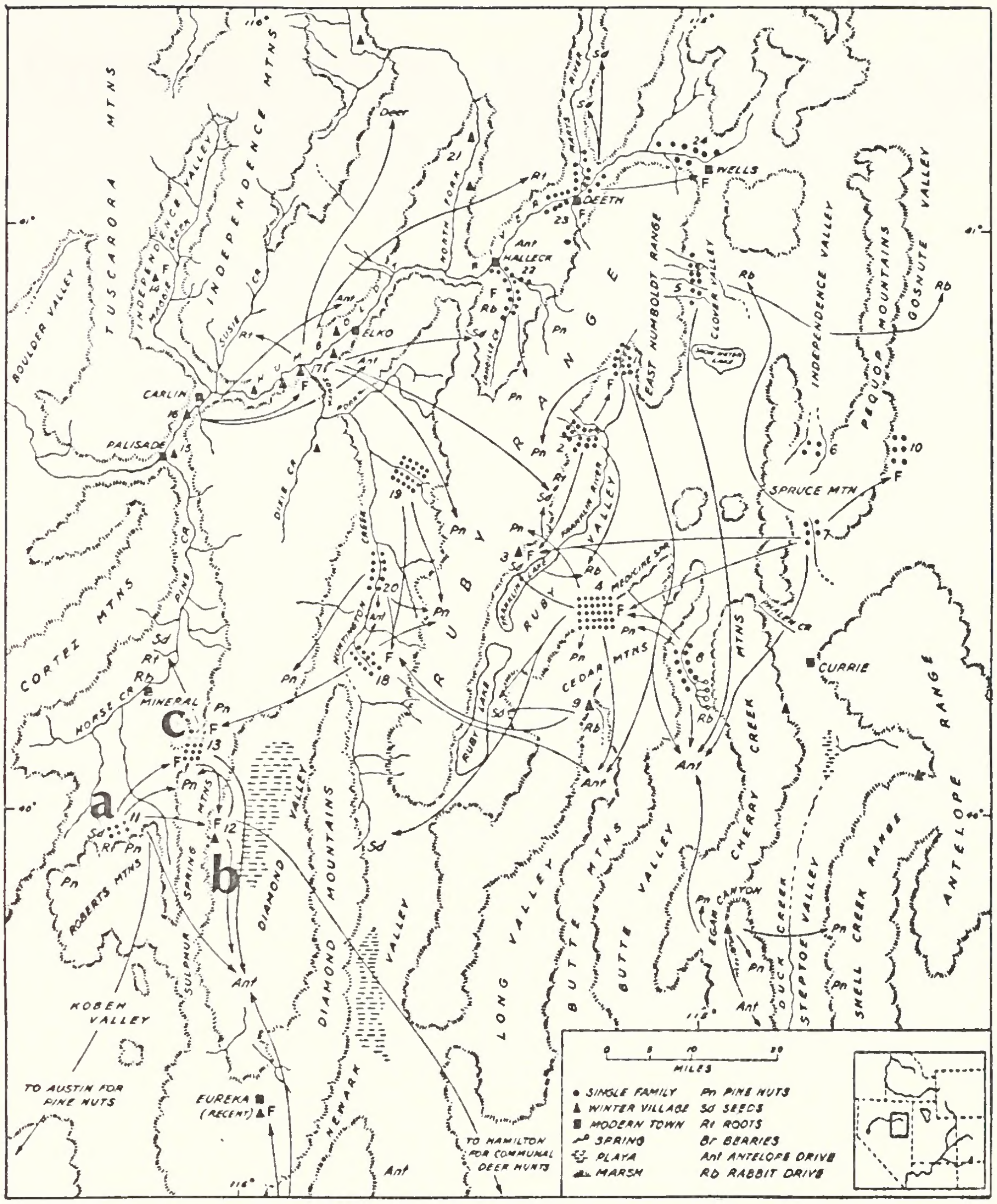

a
b
c
TUSCARORA MTNS
INDEPENDENCE MTNS
INDEPENDENCE VALLEY
BOULDER VALLEY
CARLIN
PALISADE
ELKO
HALLECK
DEETH
WELLS
HUMBOLDT
NORTH FORK
RUBY RANGE
EAST HUMBOLDT RANGE
CLOVER VALLEY
PEQUOP MOUNTAINS
GOSHUTE VALLEY
SPRUCE MTN
CORTEZ MTNS
PINE CR
MINERAL
ROBERTS MTNS
SULPHUR SPRING MTNS
DIAMOND VALLEY
DIAMOND MOUNTAINS
RUBY VALLEY
RUBY LAKE
FRANKLIN LAKE
CEDAR MTNS
CURRIE
CHERRY CREEK
BUTTE VALLEY
BUTTE MTNS
LONG VALLEY
NEWARK VALLEY
STEPTOE VALLEY
DUCK CREEK
EGAN CANYON
SHELL CREEK RANGE
ANTELOPE RANGE
KOBEH VALLEY
TO AUSTIN FOR PINE NUTS
EUREKA (RECENT)
TO HAMILTON FOR COMMUNAL DEER HUNTS
0 5 10 20
MILES
SINGLE FAMILY
WINTER VILLAGE
MODERN TOWN
SPRING
PLAYA
MARSH
Pn PINE NUTS
Sd SEEDS
Rt ROOTS
Br BERRIES
Ant ANTELOPE DRIVE
Rb RABBIT DRIVE

Figure 3. Shoshoni villages and subsistence areas in the upper Humboldt River region (from Steward 1938: Figure 11). Reported Pine Valley-Diamond Valley winter villages are (a) Bauwiyoi, (b) Tupagadu, and (c) To:dzagadu.

(a) Bauwiyoi--a group of at least six encampments at the foot of the Roberts Mountains where there are four sloughs.

(b) Tupagadu--west of the alkali flat in Diamond Valley. The spring and fall festivals were held here with Wovigunt as director.

(c) To:dzagadu (to:dzap, a medicinal plant + kadu, sitting)--on the western side of the Sulphur Spring Mountains. Fifteen or sixteen families (perhaps 90 individuals), scattered along the mountainside at springs a few miles apart.

Subsistence patterns. The lifeway of the Western Shoshoni involved a yearly cycle in which the Indians moved from place to place within their territory as food resources became available throughout different seasons.

Steward (1938:142) described the seasonal round for the people of the area as follows:

> Most pine nuts occur mainly on the western sides of ranges, especially on the Sulphur Springs and Roberts Mountains. A few grow on the Cortez Range. SF thought most of the people of these two valleys forgathered on the Sulphur Springs Range, traveling and camping in large groups. Papadom, Kuwaigunt, and other chiefs talked each morning, telling the different families where to gather.
>
> There was no band, village, or family ownership of pine-nut lands. Outsiders were welcome and even encouraged to come when the crop was good. When local crops failed Diamond Valley and Pine Creek people went as far south as Austin to gather pine nuts and to participate in festivals.
>
> When local pine nuts were harvested as many as possible were transported to the winter camps, the remainder being moved on subsequent journeys.
>
> Spring often found people weakened by insufficient stored foods and many died. When the first plants began to ripen two to four families foraged together, going from place to place until fall. In one of the tributaries of Pine Creek, probably to the west or southwest of Mineral, called Paboma (pabom, clean + pa, water), they took small fish about 4 inches long. Similar fish could be had at Tupagadu. They went north of Mineral to gather yomba[1], tsowiga[2], and other roots, then perhaps west to near Cortez or Tinaba (tina, a white rock + pa, water) to gather roots and seeds, or to

> kill woodchucks, chipmunks, and other smaller mammals. Roots not consumed at once were sun-dried and cached in pits.
>
> Prior to the fall pine-nut trip people assembled in the southern end of Diamond Valley, south of the alkali flat, to drive antelope into a corral (tuzikwep). As there was no local shaman, Kwatsuga was invited to come up from Little Smoky Valley and probably was paid for his services.
>
> Deer were sometimes hunted communally but this was done near Hamilton in northern Railroad Valley, when deer were migrating.

Elsewhere, Steward (1941:333) reported that the Diamond Valley Shoshoni practiced several other subsistence-related activities to increase wild plant growth. According to Steward's informant, SF, brush was burned in the fall, followed by spring planting of lambsquarter (probably *Chenopodium album*), flixweed tansymustard (*Descurainia sophia* = *Sophia parviflora*) and Indian ricegrass or sand grass (*Oryzopsis hymenoides*) (nomenclature follows Holmgren and Reveal 1966). Some irrigation was also practiced according to SF, though this may be a post-contact practice. Similarly, the tansymustard (*Sophia parviflora* = *Descurainia s.*) listed by Steward (1941:333) as having been sown by the Diamond Valley Shoshoni is an introduced Old World species (Steward 1938:30; see also Yensen 1981). The practice of burning areas to enhance the growth of wild plants is most likely an aboriginal activity, as evidenced among many hunter-gatherers world wide.

Other cultural aspects. Some information on festivals, chiefs, and marriages is provided by Steward (1938:143). Since other aspects of Shoshoni culture were not described, the reader should refer to Janetski (1981) for these. Additional brief notes on the Diamond Valley Shoshoni are contained in Steward (1941:*passim*).

Ethnohistorical data. Although there is not much ethnographic information on the Shoshoni groups who occupied the study area, the historic literature contains some additional

data. These include the journals of Beckwith (1855), Simpson (1876), and Burton (1963). Other sources of ethnohistorical data on the Shoshoni in the region are contained in Harris (1940) and Wells (1978).

Simpson reported a brush game drive near Garden Pass when he came through the area in May 1859.

> Notice a couple of bush-fences or barriers converging to a narrow pass, and a large hole in this last portion. Pete [Simpson's guide] says they are to guide deer near the hole, in which the Indian hides himself, and shoots them as they pass with bow and arrows at night, a fire being used as a lure (Simpson 1876:70).

Above Roberts Creek Station, Simpson described a circular brush shelter which the Indians made by piling sagebrush around living bushes.

> This afternoon, just before sundown, Lieutenant Murry and myself took a stroll up the creek to view a wick-e-up of the Diggers that visited our camp...we at last got sight of it, it being only distinguished from the sage-bushes around it by the circular form given to its development, it being made of these bushes in their growing state, and some few loose ones thrown in. To our surprise the inmates were gone (Simpson 1876:72).

A good description of the Indians along Robert's Creek who visited their camp is also provided by Simpson:

> There are three of these Indians, who appear to be grandfather, son, and grandson. They confirm the names of valleys and mountains as given by Cho-kup. I inquired of them the number of their kind of people. To this I could only get the answer there were very few of them. One of them is an old man of at least sixty years, and he as well as the others represent that they have always lived in this valley, and, never having gone far from it, cannot tell us of the water and mountains beyond their limited range. They say they have no chief, though they speak the Sho-sho-nee language; are clothed with the rabbit-skin cape, similar to the Go-shoots, and represent that they wear no leggings, even in the winter. This is scarcely credible, cold as the winter must be in this region, but it seems to be a

> fact. They are very talkative and lively. Eat rats, lizards, grass-seeds, &c., like the Go-shoots. The guide says he saw them, after throwing the rats in the fire, and thus roasting them, eat them, entrails and all, the children in particular being very fond of the juices, which they would lick in with their tongues and push into their mouths with their fingers. The old man represents that a number of his people died last winter from starvation and cold (Simpson 1876:71-72).

Two years later, Burton (1963) noted that the Indians at Robert's Creek Station were White Knife Shoshoni; however, he does subscribe to the prejudices of his time, so that one has to read between the lines about the validity of his observations.

> About the station loitered several Indians of the White-Knife tribe, which boasts, like the old Sioux and the modern Flatheads, never to have stained its weapons with the blood of a white man. They may be a respectable race, but they are an ugly [sic]: they resemble the Diggers, and the children are not a little like juvenile baboons. The dress was the usual medley of rags and rabbit furs: they were streaked with vermilion; and their hair--contrary to and more sensibly than the practice of our grandfathers--was fastened into a frontal pigtail, to prevent it falling into the eyes. These men attend upon the station, and herd the stock, for an occasional meal, their sole payment. They will trade their skins and peltries for arms and gunpowder, but, African-like, they are apt to look upon provisions, beads, and tobacco in the light of presents (Burton 1963:540).

This description contrasts with that of Simpson and indicates some of the changes that occurred for the Indians in the area within a short period of time.

NOTES

[1] yampa or squaw root (Caram gairdneri [Steward 1938:23] = Perideridia gairdneri [Holmgren and Reveal 1966]. Steward (1938:23) reported that large quantities of the root were stored for the winter.

[2] tsowiga--root not identified by Steward (1938:32).

Exploration

The historic period in the central Great Basin begins with the fur trapping expeditions which traversed the region during the 1820s and 1830s (see Cline 1963). An American party of trappers composed of Jedediah Smith and two of his men, Silas Gobel and Robert Evans, are credited with being the first Euro-Americans to cross Nevada in 1827. Their route was generally along present-day Highways 6 and 50, considerably south of the study area (Cline 1963:158; Brooks 1977:182-184). Likewise, the later trapping parties under Peter Ogden, John Works, and Walker-Leonard were north of the study area along the Humboldt River.

During the 1840s and 1850s, emigrants bound for California followed the Humboldt River Route or Hasting's Cutoff. Both of these routes were north of the Mt. Hope area. At this same time, several U. S. military expeditions journeyed through the central Great Basin during their reconnaissance of the far West. The first of these to actually penetrate the study area was Captain John C. Fremont's third expedition in 1845. Fremont and his party traveled southwest across Diamond Valley and may have crossed through the Mt. Hope area into Kobeh Valley (Thomas 1982c:9, 1983:124; see also Welch 1981:Figure 2). However, Captain Simpson (1876:65) notes in his journal that Fremont went farther southwest than Simpson did in this area.

Following Fremont's expedition a decade later, Lieutenant E. G. Beckwith (in May 1854) led one of the Pacific Railroad surveys through the region north of the study area. Beckwith's journal indicates the expedition apparently crossed the northern end of Diamond Valley by way of Railroad Pass and over the north end of the Sulphur Spring Range, probably by way of Buffey Canyon; however, none of these topographic features is actually named in the journal (Beckwith 1855:31-32).

In May 1859, a military expedition under Captain James H. Simpson (1876:66-70) blazed a road directly through the study area. Simpson was exploring the region for a new wagon route to connect Salt Lake City with Carson Valley. From Huntington Valley (his South Fork of the Humboldt), Simpson went further south than Beckwith and crossed the Diamond Range into Diamond Valley by way of the steep Overland Pass (also known as Chokop Pass as named by Simpson [1876:68; Burton 1963:538; but see Carlson 1974:76]) which is south of Railroad Pass. The Pony Express and Overland Stage would later use this same pass.

The Simpson party then proceeded southwest through Diamond Valley and over the Sulphur Spring Range near Garden Pass at the base of Mt. Hope, which Simpson named Cooper's Peak.

> The pass we have come through, a most excellent one for a wagon-road, the only steep portion being for about 100 yards at the summit. Altitude above the sea, 6,757 feet. Cedar abounds in it and on the adjacent side-hills. Immediately to our north is a conical peak, which, as we found afterward, in our journey westward, continued for days a most notable landmark, and which I call Cooper's Peak, after Adjutant-General Cooper of the Army (Simpson 1866:71).

From Simpson's description of Mt. Hope and the distances he indicates between known points on the route, the party appears to have crossed through the project area along Tyrone Creek. If so, then the pass he refers to would be a saddle at the head of Tyrone Creek. The Pony Express and Overland Stage probably followed this same route through the project area. In the nearby vicinity, Simpson (1876:70) reported the presence of what appears to be a game drive. The party camped near the future site of Roberts Creek Ranch in Kobeh Valley for two days (Simpson 1876:72-73).

On their return in July of the same year, the Simpson expedition traveled south of the project area crossing from southern Kobeh Valley into Diamond Valley by way of Devils Gate, which Simpson (1876:113) named Swallow Cañon.

After the Civil War, several other military surveys explored the region for geological and other scientific studies. These were the U. S. Geological Exploration of the Fortieth Parallel under Clarence King, conducted between 1867 and 1869, and the U.S. Geographical Surveys West of the One Hundredth Meridian under Lieutenant George M. Wheeler, conducted between 1869 and 1879 (Bartlett 1962). King's work was north of the project. One of Wheeler's survey parties passed through the area in 1871 and collected information on the mining districts including Mineral Hill, Diamond, and Eureka (Wheeler 1872:15, 35-37).

Transportation and Communication

The first mail service through Nevada was Woodward and Chorpenning's "Jackass Mail" which followed the Humboldt River route from 1851 to 1853 (Angel 1881; Welch 1981:6-7). Between 1854 and 1853, Chorpenning carried the mail along a southern route from Salt Lake City to San Diego. In 1858, Chorpenning opened a new route which ran through the northern end of Diamond Valley and into Pine Valley before rejoining the other route on the Humboldt at Gravelly Ford near Beowawe (Welch 1981:7). Following Simpson's 1859 exploration of a more direct route between Salt Lake City and Genoa, Chorpenning moved his line to this route (Welch 1981:7).

In 1860, Russell, Majors, and Waddell's Pony Express used the Simpson or Central Route. In the study area, the Pony Express Trail ran from northeast to southwest along the base of Mt. Hope, connecting the Robert's Creek and Diamond Springs Stations (Mason 1976:34-40). In October 1861, the short-lived Pony Express was discontinued due to heavy financial losses and the completion of the transcontinental telegraph line. Several months earlier, the Butterfield Overland Mail and Stage Company had been transferred to the Central Route. Prior to this time, the route ran through the Southwest but was abandoned due to

anticipated problems with the onset of the Civil War (Angel 1881:105). The Overland Stage continued to follow the Central Route until eclipsed by the opening of the transcontinental railroad in 1869.

Several stations existed along the Pony Express-Overland Stage route near the study area. The Robert's Creek and Diamond Springs Stations were constructed by the Pony Express. Another station on the route, built by the Overland Stage, probably in 1863, was that of Sulphur Springs, which was between the two aforementioned stations (Mason 1976:37).

Sir Richard Burton, who traveled along the Pony Express route in October 1860, briefly described Diamond Springs and Robert's Creek Stations and ate lunch at the site of Sulphur Springs (Burton 1963:538-542). In his description of Sulphur Springs, he wrote:

> Shortly after noon we left Diamond Springs, and carried on for a stretch of seven miles to our lunching ground, a rushy water, black where it overlies mud, and bluish-green where light gravel and shells form the bottom: the taste is sulphury, and it abounds in a confervae and animalculae like leeches and little tadpoles. After playing a tidy bowie-knife, we remounted, and passed over to the rough divide lying westward of Moonshine Valley [Diamond Valley] (Burton 1963:539).

Burton noted that Robert's Creek Station recently had been burned down by Indians and was only partially rebuilt. He also provides some brief, albeit biased, references on the Indians in the area, as mentioned above (Burton 1963:540-541).

Following the completion of the Central Pacific Railroad along the Humboldt River in 1869, freight and stage lines connected the mining districts in the region with the railroad. One such line, established in 1870, was Ennor and Woodruff's stages which ran from Palisade through the study area to Eureka and on to Hamilton; a fast freight line (probably Pritchard's)

was opened along this route in 1871 (Angel 1881:439-440; Bancroft 1890:283).

In November 1873, a company was formed by Woodruff, Ennor, and three others to build a narrow gauge railroad the 90 miles between Eureka and Palisade. After California investors took over construction in 1874, the Eureka and Palisade Railroad was completed by October 1875 (Bancroft 1890:239, 283). Due to the fluctuations of the Eureka mines and other problems, the railroad operated on a discontinuous basis until the line was abandoned in 1938 (Myrick 1962:90-111).

Several stations were built along the railroad. Near the study area, these were from north to south, Alpha, Pine, Oak, Garden Pass, and Diamond (Myrick 1962:920). There was also a Mt. Hope Station located a mile east of the mining area (Vanderburg 1938:58). For a short time after Alpha was founded in 1874, it was a thriving community. The town was twice served by a post office, first between 1877 to 1886 and later from 1919 to 1924. Pine Station also had a post office from 1886 to 1888 (Frickstad and Thrall 1958:1, 22).

Mining and Related Developements

The major impetus for settlement of the region was that of mining. The earliest mining in the central Great Basin occurred around Austin in 1862 when a former Pony Express rider discovered a quartz vein while hauling wood (Angel 1881:461). In the following year, the Cortez Mining District was established at Mt. Tenabo above Grass Valley northwest of the Mt. Hope area (see Hardesty and Hattori 1982 for a discussion on the historic archaeology of the district).

Shortly thereafter in 1864, silver was found at Eureka, but it was not until 1869 that the town was established. Mining activity at Eureka and nearby Ruby Hill was soon flourishing. As

a result of the area's rapid population growth, Eureka County was created out of Lander in 1873. The burgeoning community was so prosperous that a railroad was completed by 1875 between Palisade and Eureka. In 1876, nineteen furnaces for processing the ores were operating in Eureka (Angel 1881:431); and as early a 1871, it had been dubbed "The Pittsburgh of the West" from the fumes emitted by the furnaces. Production figures between 1869 and 1883 indicated that $40 million in silver, $20 million in gold, and 225,000 tons of lead were extracted in the district (Lincoln 1923:89).

Eureka grew so quickly, houses had to be brought into the town from other communities in the region:

> According the the Sentinel of July 23, 1870, forty-three houses were erected in one week; three came from Carlin, 100 miles; twelve from Hamilton, forty miles; four from Treasure City, forty-three miles; sixteen from Sherman, forty-five miles; and three from Elko, 123 miles (Angel 1881:439).

From this account, we see the rapid changes that occurred as structures were shuffled from one boom-bust mining community to another, even as early as 1870. Such a pattern characterizes many frontier mining areas, particularly in Nevada, and thus complicates the archaeological record.

Since the history of Eureka is extensive and not germane to the present discussion, it is not presented here. Details can be found in numerous sources (e.g., Angel 1881; 425-441; Bancroft 1890:282-285; Curtis 1884; Hague 1892; Lincoln 1923:88-93; Paher 1970:180-185; Reichman 1967).

Several other mining districts have existed near the Mt. Hope area at one time or another. These include Alpha, Diamond, and Diamond Marsh. The Alpha District was located north of Mt. Hope and on the slopes of the Sulphur Spring Range.[1] Emmons

(1910:99) described Alpha as a small camp five miles east of the Alpha Station on the E & P Railroad. Three miles west of the mines, a concentration plant known as Chimney Station contained ten stamps and five vanners, but Emmons noted that little ore had been treated at the plant. The district apparently did not exist before 1880, for there is no mention of it by Angel (1881:435-436).

The Diamond District was established in 1864 after silver-bearing ores were discovered in the Diamond Range north of the Diamond Springs Pony Express-Overland Stage Station. In 1873, a smelter was erected at the Champion Mine; however, mining in the district yielded little (Angel 1881:425,429; Lincoln 1923:87-88; Paher 1970:188; Wheeler 1872:36; Whitehill 1873:79). Another, apparently more recent, Diamond District (also known as Phillipsburg) is reported further south closer to Eureka, which has created some confusion in the later mining literature (see Roberts et al. 1967:74 and maps). For instance, Paher (1970:188) describes the older Diamond District, but gives directions and a map plot (Paher 1970:map inside front cover) for the more recent district. Roberts et al. (1967:74 and maps) did not even realize there were two Diamond Districts, for they combine the descriptions for both and show the location of the newer district.

The Diamond Marsh District, or William's Salt Marsh, was located at the north end of Diamond Valley, 43 miles north of Eureka (Angel 1881:436; Lincoln 1923:88; Reichman 1967:101; Whitehill 1873:80). In contrast to the other districts, salt was the mineral that was "mined" here in order to process the silver ores in Eureka, Mineral Hill, and Hamilton during the 1860s and 1870s. In the early 1870s, Whitehill (1873:80) reported that 5000 pounds of salt per day were produced by heating twenty-two pans that measured ten feet long, four feet wide, and ten inches deep. The heat for the process was supplied by two horizontal furnaces with twenty foot chimneys (Reichman 1967:101). The

extraction of salt for use in processing ores also occurred in other valleys throughout the region, including Grass Valley (White 1869:47) where Indian laborers are reported to have been employed (Hardesty and Hattori 1982:11).

As for the Mount Hope District, it is not mentioned in published mining reports prior to the 1930s (e.g., Angel 1881; Bancroft 1890; Emmons 1910; Lincoln 1923: Raymond 1870; Wheeler 1872), nor are production figures listed for the period 1865-1940 (Couch and Carpenter 1943). Whitehill (1873:79) and Angel (1881:435) do note the existence of the Leopold District near Robert's Creek Station organized in 1870, but that little work was carried out. It is not known if the Leopold District was the forerunner of the Mount Hope District. Carlson (1974:136) indicates Mt. Hope was named for Samuel J. Hope and was originally called Cooper's Peak by Captain James H. Simpson (1876:71).

Some early historical data on the Mount Hope District are provided by Vanderburg (1938:58-59), Roberts et al. (1967:103-104), and Matson (1946). Apparently, zinc ore was discovered in the 1870s by charcoal burners who were listed as Basques by Matson (1946) and Roberts et al. (1967:103), although they may have been Italian, as were most charcoal burners at this time. It was not until 1886 that work began at the Mount Hope mine which is the only productive property in the district; four areas have been worked since that time: Lorraine area, Whim shaft, Mount Hope No. 1 adit, and No. 2 adit (Roberts et al. 1967:103, Plate 11; Figure 4, this report).

Roberts et al. (1967:103) summarize the history of the district as follows:

> The major workings in the Lorraine area were opened in 1886. In 1890 Thomas Wren drove the Mount Hope No. 2 adit; Wren also sank the Whim shaft. In 1926 the U. S. Smelting, Refining, and Mining Co. drove the Mount Hope No. 1 adit, and in 1928 the property was optioned to the

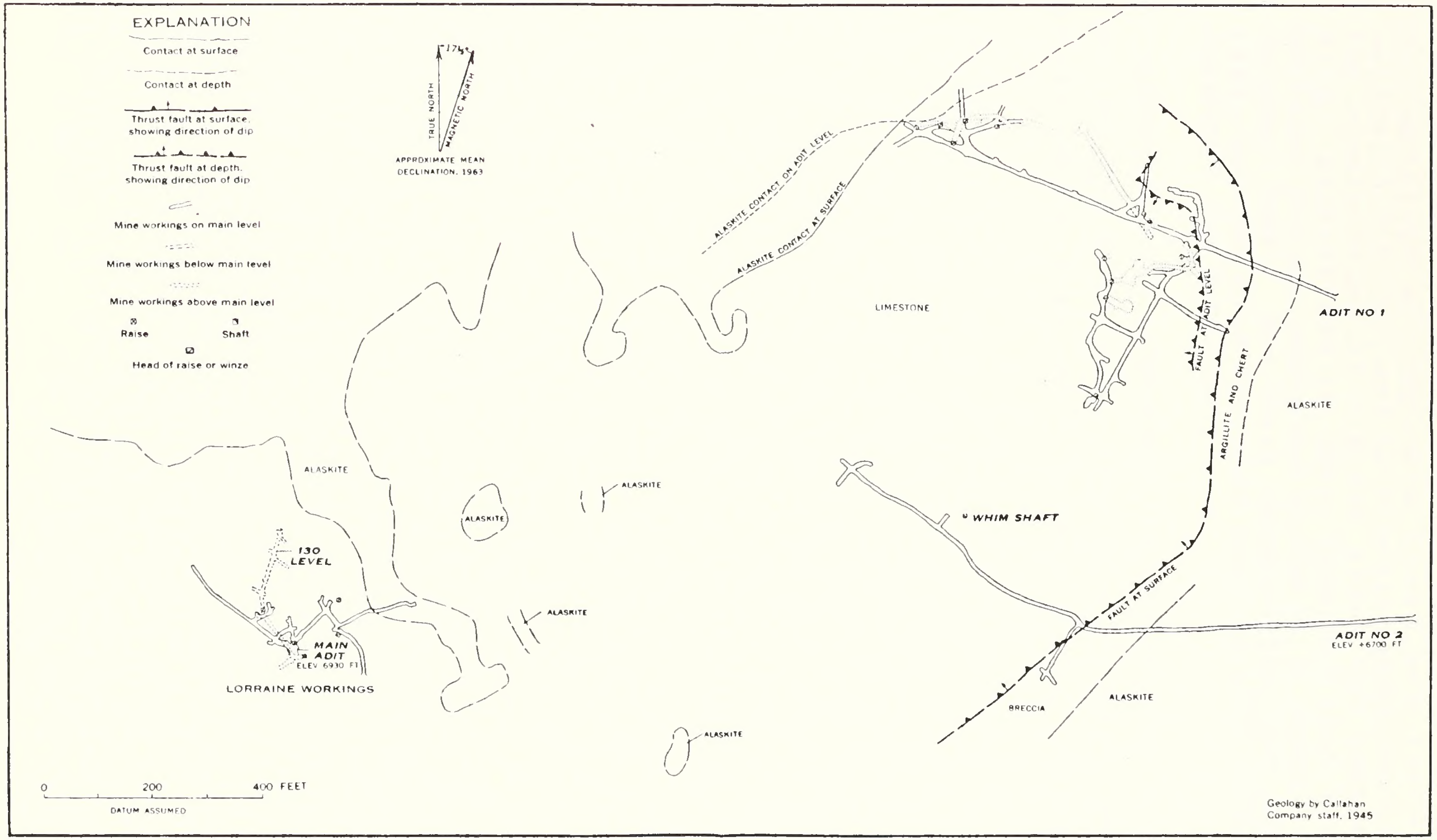

EXPLANATION
Contact at surface
Contact at depth
Thrust fault at surface, showing direction of dip
Thrust fault at depth, showing direction of dip
Mine workings on main level
Mine workings below main level
Mine workings above main level
Raise
Shaft
Head of raise or winze
17½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1963
ALASKITE CONTACT ON ADIT LEVEL
ALASKITE CONTACT AT SURFACE
LIMESTONE
FAULT AT ADIT LEVEL
ARGILLITE AND CHERT
ADIT NO 1
ALASKITE
WHIM SHAFT
FAULT AT SURFACE
ADIT NO 2
ELEV +6700 FT
BRECCIA
ALASKITE
ALASKITE
ALASKITE
ALASKITE
ALASKITE
ALASKITE
130 LEVEL
MAIN ADIT
ELEV 6930 FT
LORRAINE WORKINGS
0
200
400 FEET
DATUM ASSUMED
Geology by Callahan Company staff, 1945

Figure 4. Map of the Mount Hope Mine (from Roberts et al. 1967:Plate 11).

> Universal Exploration Co. Universal prospected by churn and diamond drilling and purchased the property in 1930. Additional exploratory work was done by a number of lessees until the early 1940's, when Callahan Zinc-Lead Co. obtained a long-term lease and initiated an extensive drilling and development program, including the construction of a power plant and concentrating mill. Exploration in 1943, 1944,and 1945 included a drilling program conducted by the U. S. Bureau of Mines (Matson, 1946). The first concentrates were shipped in 1945, but the mine was shut down in 1947 after a fire destroyed the powerhouse.

These authors mention production figures on gold, silver, copper, and lead for the years 1941, 1944-1947. In total, production was $1,335,393 during these years (Roberts et al. 1967:Table 12).

Aside from the mining of precious minerals and salt, another related activity left its mark on the study area. This concerns the cutting of the pinyon-juniper woodland and reducing the wood to charcoal to power the smelters in Eureka, Chimney Station near Alpha, and other adjacent mining districts. In 1880 alone, it is estimated that 1.25 million bushels of charcoal were consumed in the Eureka smelters (Young and Budy 1979:117).

Those employed as woodcutters and charcoal-makers around Eureka were mostly Italian and Swiss-Italian immigrants, some of whom had prior experience in charcoal burning (Young and Budy 1979:118, 119). In making charcoal, pinyon was cut and dried before being burned in earth-covered pits (see Young and Budy 1979:116-117 for details). Near the project area at the north end of the Roberts Creek Mountains, the remains of charcoal burning areas have been recorded recently (Stornetta 1982). These consist of circular charcoal beds, 12 to 25 m in diameter, with historic glass fragments and axe cut stumps in the vicinity. In order to produce charcoal from juniper and mountain mahogany, a high burning temperature had to be achieved by constructing beehive-shaped ovens from stone. The remains of these types of ovens are still visible at Ward and Bristol in eastern Nevada.

According to Young and Budy (1979:117), who have researched the effect that charcoal production and other historic activites had on the pinyon-juniper woodland in Nevada:

> The demand for charcoal was so great that deforestation became a severe problem. From our estimates of wood yield, 4,000 to 5,000 acres of woodland had to be cut annually to supply the Eureka mills. By 1874 the mountain slopes around Eureka were denuded of pinyon and juniper for a radius of twenty miles. By 1878 the average hauling distance from pit to smelter was thirty-five miles.

Given the haul distance, it can be assumed that woodcutting and charcoal burning was conducted in the Mt. Hope vicinity.

Further evidence of this activity in the project area is provided by 1880 records of the Eureka and Palisade Railroad which indicate that cordwood and charcoal were hauled from the way-stations to Eureka (Angel 1881:285). The stations listed along the line included Bradleys, Blackburns, Alpha, Oak, Summit, Horse Shoe, Garden Pass, Old Fourth, and Diamond. Haul rates for charcoal varied from 27-1/2 cents per 100 lbs. between Bradleys and Blackburn, to 10 cents per 100 lbs. at Diamond, the station closest to Eureka. Wood cost $4.00 per cord between Summit and Garden Pass, and $2.50 per cord from Old Fourth and Diamond (Angel 1881:285).

As areas distant from Eureka were stripped of their trees, transportation costs greatly increased. This, in part, eventually led to a conflict known as the "Charcoal Burners War" or "Nevada's Italian War" (Young and Budy 1979:118-119; Earl 1969; Angel 1881:438; Bancroft 1890:284-285).

The severe deforestation in the area also had another effect on the environment and economy. Several times in the 1870s portions of Eureka were destroyed by violent flash floods during the summer months (Angel 1881:441). Without the pinyon-juniper trees, there was little vegetation to hold back the water,

allowing it to run off the denuded hills. Overgrazing in the area undoubtedly intensified the problem.

NOTES

[1] It should be noted that the Sulphur Spring Range was called the Pinyon Range in several geological accounts and on topo maps prior to the 1920s (Emmons 1910:88-89, Plate 1; Hague 1892:200-201). On later topo maps (1927 USGS Roberts Mountains, Nev., 1:250,000; 1937 USGS Mineral Hill, Nev., 15' quad), the range is shown as the Sulphur Spring Range. The Pinyon Range now refers to only the northern end of the range, just south of the Humboldt River.

RESEARCH DESIGN

In order to assess effectively the archaeological potential of an area, the field work should be guided by a research design; without it, certain aspects of the archaeological record or the importance of the archaeolgical finds may be overlooked entirely. The research design aids in determining the significance of archaeological sites with respect to the National Register. The first step in the formulation of a research design is a review of the prehistory and history literature of the region, as we have given in the previous sections. From this review, several research problems which can be examined during the archaeological survey are apparent.

For the prehistoric period, research problems include the identification of the cultural chronology of the area and the establishment of the settlement and subsistence patterns. With regard to the historic period, problems consist mainly of reconstructing historic land use patterns and identification of ethnic populations. Both the prehistoric and historic research problems are, of course, very broad and encompass smaller research topics. Other prehistoric research problems for central and eastern Nevada recently have been outlined by Hanes and Ball (1982) and James and Zeier (1982), some of which are incorporated in the present discussion.

Cultural Chronology

The general outline of the cultural chronology for the Great Basin has been established in the past few decades. We know that different prehistoric populations have occupied the region throughout the past 10,000 to 12,000 years. These archaeological cultures include pre-Archaic (11,000-8000 B.P.), Archaic (8000 B.P.-A.D. 1300), and Numic (A.D. 1300-ca. A.D. 1850), and possibly Fremont (A.D. 500-A.D. 1300) peoples. With the exception of the Fremont, whose subsistence was based in part on

horticulture, the material culture and subsistence of these peoples were very similar; there are, however, some distinctive stone tools, as well as other artifactual remains, which can be used to distinguish these peoples from one another and place them in time.

Although the prehistory of the Great Basin as a whole extends back about 12,000 years, David H. Thomas maintains that intensive aboriginal occupation is only 5500 years old in the central Great Basin and evidence for earlier pre-Archaic cultures is essentially absent (Thomas 1982a:161). Such is not necessarily the case, however, for recent research in Grass Valley by Robert Elston and his associates has located an extensive pre-Archaic site on an early Holocene shoreline formed by pluvial Lake Gilbert. Cultural materials on the site include Great Basin Stemmed and fluted projectile points, crescents, and large basalt tools.

Thus, sites older than 5500 years do exist in the central Great Basin. Part of the reason Thomas found so little evidence for pre-Archaic and Early Archaic assemblages may be the fact that large pluvial lakes did not exist in the Reese River and Monitor Valleys (see Hubbs et al. 1974:Figure 2; Mifflin and Wheat 1979) where Thomas conducted his surveys. Generally, most pre-Archaic sites are associated with shoreline features of the larger pluvial lakes of the late Pleistocene and early Holocene. On this basis, pre-Archaic sites would not be expected in the Reese River and Monitor Valleys, as suggested by Thomas's data. However, we expect to find pre-Archaic evidence in those basins containing pluvial lakes.

As discussed above, pluvial Lake Diamond filled Diamond Valley during the late Pleistocene, the high stand of which was 1829 m (6000 ft). One research problem to be addressed by the present survey concerns whether or not there is any evidence of pre-Archaic or Early Archaic cultures in the Mt. Hope area.

Other problems of chronology involve the extent to which later cultures are represented in the study area. We expected to find evidence of late Archaic and Numic populations, and we expected our findings in the Mt. Hope area to be comparable with the Reese River, Monitor Valley, and Grass Valley areas. Although not expected, we also wanted to know if there is any evidence of the Fremont in the study area.

For the purpose of dating archaeological sites and establishing their cultural affiliations, projectile points are one of the most important artifacts available to the archaeologist. Projectile points are especially important in the Mt. Hope study because, at the present level of investigation, the data that we gather is based on surface sites alone without the aid of radiocarbon samples obtained in excavations to date the sites.

Descriptions of the various Great Basin projectile points we were likely to find have been summarized by Heizer and Hester (1978) and Thomas (1970, 1981b; Thomas and Bettinger 1976). In addition, Thomas has developed a projectile point key so that some standard of comparison can be made when assigning types to projectile points recovered on the survey, and establishing the cultural affiliation of the sites from which the points were recovered.

Another artifact type which can be used for dating and cultural affiliation is pottery. Shoshoni pottery is the most likely type to be found in the study area. Shoshoni pottery was probably manufactured between A.D. 1300 and A.D. 1850 by the Western Shoshoni who occupied the region at that time. Descriptions of Shoshoni pottery are contained in several sources (e.g., Beck 1981; Coale 1963; Rudy 1953:94-98; Tuohy 1956).

Another pottery type which may be found in the study area was made by the Fremont between A.D. 500 and A.D. 1300. Fremont

pottery is a distinctive, well-made, plain gray or painted ware that differs from the less refined Shoshoni brownware. Descriptions of the various Fremont pottery types are found in Madsen (1977). Since only a few sherds of Fremont pottery have been found in central Nevada, its occurrence in the Mt. Hope area was considered to be unlikely (see James 1981:Figure 13).

Settlement and Subsistence

A basic research topic addressed by results of the survey concerns the identification of prehistoric settlement and subsistence patterns in the Mt. Hope area. The ethnographic and ethnohistoric records suggest that the former Shoshoni inhabitants most likely utilized the area in the course of their seasonal hunting and gathering, but just how intensively the area was used or the extent to which the pattern varied over time, was unknown. The ethnographic information given by Steward (1938) indicates some of the activities which might have occurred.

During the spring and summer months, the major subsistence activity was the gathering of wild plant foods, some of which may have been cached for winter use. Small game such as marmots, woodrats, ground squirrels, and chipmunks would have been hunted in various areas, especially around rock crevices. In the fall, the Diamond Valley and Pine Creek Shoshoni gathered pine nuts in the Sulphur Spring Range. Most pine nuts were transported back to winter villages, but some were stored in caches in the pinyon groves. Prior to the fall pinyon harvest, communal antelope hunts were held in southern Diamond Valley, where the animals were driven into brush corrals. Near Garden Pass, Simpson (1876:70) observed brush fences reported to have been used for deer hunting at night, but they could have been used for antelope as well.

Steward's (1938:141-142) ethnographic account of the Diamond Valley and Pine Creek Shoshoni indicates that winter villages

were not located within the project area. The nearest winter village was that of Tupagadu, on the west side of Diamond Valley at the base of the Sulphur Spring Range. The exact location of Tupagadu is not provided by Steward, but his map of the area (see Figure 3) places the village in the vicinity of Shipley Hot Spring, about 19 air km northeast of Mt. Hope. Steward mentions that small fish were available at Tupagadu. According to Hubbs et al. (1974:17-18), the native fish in this area were speckled dace (*Rhinichthys osculus*) found at Shipley Hot Spring and tui chub (*Gila bicolor*) present in Sulphur Spring and possibly at Bailey Ranch. This evidence, along with Steward's map location, suggests that Shipley Hot Spring is the most likely location of Tupagadu, although unnamed winter villages could have been at Sulphur Spring and Bailey Ranch as well.

Based on this ethnographic evidence, we did not expect to find winter villages in the project area. The paucity of permanent water within the immediate area and its altitude, as described in the Environmental Setting section, would have acted as a deterrent for winter settlement. Undoubtedly, some habitation did occur at other seasons of the year. This is suggested from an ethnohistoric observation provided by Simpson in May 1859. Along Roberts Creek (his Willow Creek), Simpson (1876:72) described what appears to be a circular windbreak formed by piling loose sagebrush around living bushes. Such windbreak structures were used by other Numic groups in the Great Basin during the summer and for temporary camps (Steward 1941:282, 334; Stewart 1941:377).

In order to relate the archaeological materials discovered on the survey to the prehistoric use of the study area, the material remains of various settlement-subsistence activities must be recognized. Some hunting and gathering activities leave no trace in the archaeological record, while the remains of other activities are tangible and visible (Thomas 1983).

For instance, fall pinyon harvesting may be represented by several archaeological manifestations. Although considerably rare, artifacts used in gathering pine nuts might be found in caches. One such cache near an historic pinyon camp yielded pinyon gathering hooks, conical burden baskets, and a winnowing tray (Busby 1974; Fenenga 1975). The roasting of pinyon cones to extract the nuts may be evidenced by circular, charcoal stained areas, often in association with pinyon camps (Barrett 1917:13; Dutcher 1893; Egan 1917:241; Fenenga 1975). Pinyon camps containing temporary structures, manos and metates, hearths, pinyon roasting areas, and other material remains have been observed (Barrett 1917:13; Dutcher 1893; Fenenga 1975), as well as caches where pinyon cones were stored (Egan 1917:242; Hoffman 1878:473). An excellent description of pinyon caches in an area south of Eureka is provided by Hoffman (1878:473). He observed that pinyon caches consisted of stone circles between two to four feet in diameter in which the cones were placed and covered then with sticks, leaves, and a layer of earth. Interestingly enough, few pinyon caches like the ones described by Hoffman have been reported in the archaeological record, but they are probably more prevalent than the available evidence indicates.

As suggested by Simpson's historic observation, game drives might be found in the study area. Some brush game drives have been preserved in the Great Basin (Raymond 1982). More commonly, game drives are represented by the remains of low rock walls or alignments (James n.d.; Rudy 1953; Thomas and McKee 1974; L. Pendelton, personal communication, 1982). Other hunting features which might be associated with game drives include talus pits, hunting blinds, and stone cairns (Brook 1980; Elston and Davis 1979; Nissen 1974). Broken projectile points lost or discarded during hunting may be present near hunting features. Ad hoc utilized flakes and bifacial tools used in butchering may also be found in the vicinity.

The remains of habitation structures could occur in the

study area. These would probably consist of circular rock outlines, three to five meters in diameter, which represent the footings of temporary brush shelters. Chipped and ground stone materials are often present on the ground around rock outlines (e.g., see Thomas and Bettinger 1976 for descriptions of such sites).

While pinyon harvesting sites, game drives, and temporary habitation sites were expected in the Mt. Hope area as suggested by the ethnographic record, other types of sites could be present. Therefore, a more theoretical site type scheme is indicated.

On a generalized level, Binford (1980) has developed a settlement-subsistence model which characterizes hunter-gatherers on the basis of their food procurement strategies. At the low end of the spectrum are foragers who gather food on a daily basis and practice little or no food storage. These groups frequently establish new residential bases and locations (i.e., task sites) in the search for food. Higher on the continuum are collectors who subsist on stored foods for part of the year and, in addition to fewer residential bases, establish field camps for food procurement.

In applying Binford's model to the Great Basin and Colorado Plateau, Holmer (1980) has developed a functional site classification to test the implications of the model in the archaeological record. Holmer's (1980) site typology is useful for our study of the Mt. Hope area, with a slight modification to some of the terms he employed. Based on the ethnographic pattern for the region, the Western Shoshoni are close to collectors on the continuum. The types of sites produced by the Western Shoshoni in the course of their seasonal movements would include base camps, field camps, task sites, caches, and special purpose sites (i.e., rock art).

Base camps would have been occupied for several weeks to several months or longer, as in the case of winter villages. A variety of activities would have transpired at the base camps, depending upon the length of occupation. These included food processing and consumption, and manufacture, maintenance, and repair of tools and equipment used in procuring and processing food resources. The archaeological remains of these activities might consist of projectile points, scrapers, drills, knives, lithic debitage, manos, metates, and pottery. Features such as fire hearths and structural depressions or rock rings might be present.

As opposed to base camps, field camps were occupied for very short periods of time, often only overnight, for the purpose of procuring food resources. The number of activities occurring at field camps was very limited, resulting in few materials being left at these sites. Field camps can be differentiated from base camps by their lack of structures and other features, and by the small number of cultural materials which are present.

Task sites were occupied for the purpose of procuring and/or processing food resources; no overnight activity is inferred. Due to the ephemeral nature of the procurement activity, some activities, such as plant gathering, may not be represented in the archaeological record. Other activities, such as butchering, plant processing, and hunting might leave behind a small number of material items so that small lithic scatters, grinding tools, and isolated projectile points represent task sites.

In the seasonal pattern of the Western Shoshoni, plant foods and cultural items were sometimes placed in caches for later use. Occasionally, these types of sites are found in the archaeological record. Special purpose sites include rock art and lithic quarries.

As indicated above, the major settlement and subsistence

problem which requires attention is to establish the functional aspects of the sites we found during the survey. Once we have done this, other problems concerning diachronic changes in settlement-subsistence patterns remain. If Thomas (1982a) is correct, settlement and subsistence patterns have been relatively stable over the past 5500 years in the central Great Basin and are essentially the same as those recorded ethnographically for the Western Shoshoni. In other areas of the Great Basin, there is more variability in the archaeological record (e.g., Elston 1982; Madsen 1982).

Concerning the inception of pinyon exploitation, if current paleoenvironmental evidence is correct, pinyon was absent or very limited in its distribution in the central and eastern Great Basin prior to the mid Holocene (Currey and James 1982:39) and could not have been available in sufficient quantities for exploitation until after that time. Further, evidence from the Owens Valley in eastern California suggests that heavy pinyon exploitation did not occur until late in the prehistoric period. Just when intense pinyon exploitation occurred in the central Great Basin needs to be better documented. We were hopeful the present survey could contribute something toward this problem.

Paleoenvironmental Change

Because prehistoric populations were closely tied to their natural surroundings, environmental changes often had pronounced effects on cultural adaptation, stability, and change. Several paleoenvironmental syntheses of the surrounding regions have been published which provide background data (Davis 1982; Currey and James 1982); however, a great deal of paleoenvironmental work in the central Great Basin remains to be done.

While it is beyond the scope of the baseline work to conduct paleoenvironemental research in the study area, attention during the survey to woodrat middens in crevices and rockshelters,

volcanic ash layers exposed in drainages, and other potential data sources which could be used to reconstruct the paleoenvironment in future studies is in order.

Historic Patterns

The historical overview of the region indicates that several economic activities have occurred in the study area. In the early historic period between 1859 and 1869, major transportation and communication routes passed through the area in a northeast-southwest direction. These include Simpson's initial development of a wagon route in 1859, Chorpenning's mail carriers, the Pony Express trail, the Overland Stage route, and the transcontinental telegraph line. After 1869, a stage and freight line was developed over Garden Pass between Palisade and Eureka. In 1875, the Eureka and Palisade Railroad was completed along the same route.

One research problem to be addressed by the survey is the extent to which these routes can be identified on the ground in the project area. The route of the E & P Railroad is shown on topographic maps, but what about the other transportation routes? Are datable historic artifacts (i.e., whiskey bottles, cans, wagon parts) present along these routes? Is the E & P Railroad Mt. Hope Station (or other way stations) to be found and dated? There were undoubtedly work camps associated with railroad construction. Can these be identified along the railroad, and if so, what does it tell us about the people working on the railroad?

Mining is activity documented in the project area. Most of the mining at the Mt. Hope Mine occurred after 1940, but there was earlier activity. Are the remains of the early mining still visible? In the 1870s, the Leopold District is reported to have been somewhere in the project area. Can the remains of this district be located?

Pinyon cutting and charcoal burning were related to mining in the region. Is there evidence of this activity in the project area? If so, are work camps associated with these sites? What archaeological evidence remains of this activity and can it be dated to this period?

Ethnic Populations

The historic record indicates charcoal production was performed by Italians. If charcoal burning and/or pinyon cutting areas are identified in the study area, is there evidence of Italians or other ethnic populations at these sites? What other ethnic groups are represented in the study area? Were Chinese laborers employed in constructing the E & P Railroad? If so, is there evidence of this ethnic group in the study area? Ethnicity is sometimes difficult to establish in archaeology, but distinctive material remains (e.g., Chinese pottery, Mexican ceramics, Chinese coins, etc.) can be used to assign sites to a particular culture, as well as to date them.

METHODS AND TECHNIQUES

The project area consists of the Mine Area and three alternate tailings ponds--Sites B, I, and J. Intermountain Research surveyed approximately 10% of these four areas, roughly 1700 acres, in accordance with current BLM cultural resources survey guidelines (BLM 1982).

Pre-Field Work

At the inception of the project, the site files of the Bureau of Land Management, Battle Mountain District, and the Nevada State Museum were examined to determine the findings of earlier cultural resource surveys in the project area and to identify archaeological sites which may have been recorded prior to this work. The results of the archives research are given in Tables 2, 3, and 4. The National Register of Historic Places was consulted with the result that no National Register properties are in or near the project area. A research design was then formulated to guide all subsequent work.

Prior to the field work, a strategy was developed for the conduct of the sampling. Since the areas delineated by Exxon Minerals Corporation for Sites B and J were irregular in shape, rectangular shapes were superimposed on them in order to facilitate the archaeological survey. No changes were made for the boundaries of the Mine Area and Site I which are polygonal. After slightly modifying the shapes of Sites B and J, the four areas total about 17,000 acres: Mine Area--10,560 acres; Site B--1920 acres; Site I--2560 acres; and Site J--1960 acres.

The 10% sample was accomplished through the use of random systematic transects. Transects have been shown to be a most effective sampling design (Judge et al. 1975:93; Plog 1976). In order to avoid the clustering of transects that a strictly random sample might generate, the first transect was drawn from a random

population for each survey area and then the rest of the transects in each survey area were established systematically at specified intervals from the first transect.

To assist in locating the transects in the field, they were plotted on color aerial photos using mylar overlays. Sections lines were also projected onto the aerial photos.

Areas surveyed in addition to the 10% sample were a corridor along the proposed highway relocation route, and a small area extending up a drainage adjacent to and northeast of Site B.

Field Work

Each transect was walked in a cardinal direction by a survey crew of two persons spaced 30 meters apart. Thus, the width of the transect is considered to be 60 meters and assumes that a crew person can effectively observe 15 meters of the ground surface to either side. Due to steep terrain and access problems on Mt. Hope, transects in the mine area were oriented in a true east-west direction as were transects in Site I (in order to cross beach features formed by Pleistocene Lake Diamond). Transects in Sites B and J were oriented true north-south (see Figures 5, 6, and 7).

All the transects in the sample were completed, with the exception of portions of transects occuring on top of Mt. Hope in the Mine Area. Here, three transects could not be completed because of snow cover (Figure 5). As a result, about 9%, rather than 10%, of the Mine Area was sureyed.

Laboratory

Collected artifacts were cleaned, labeled, and cataloged in the IMR Laboratory. Catalog numbers consist of the Nevada State

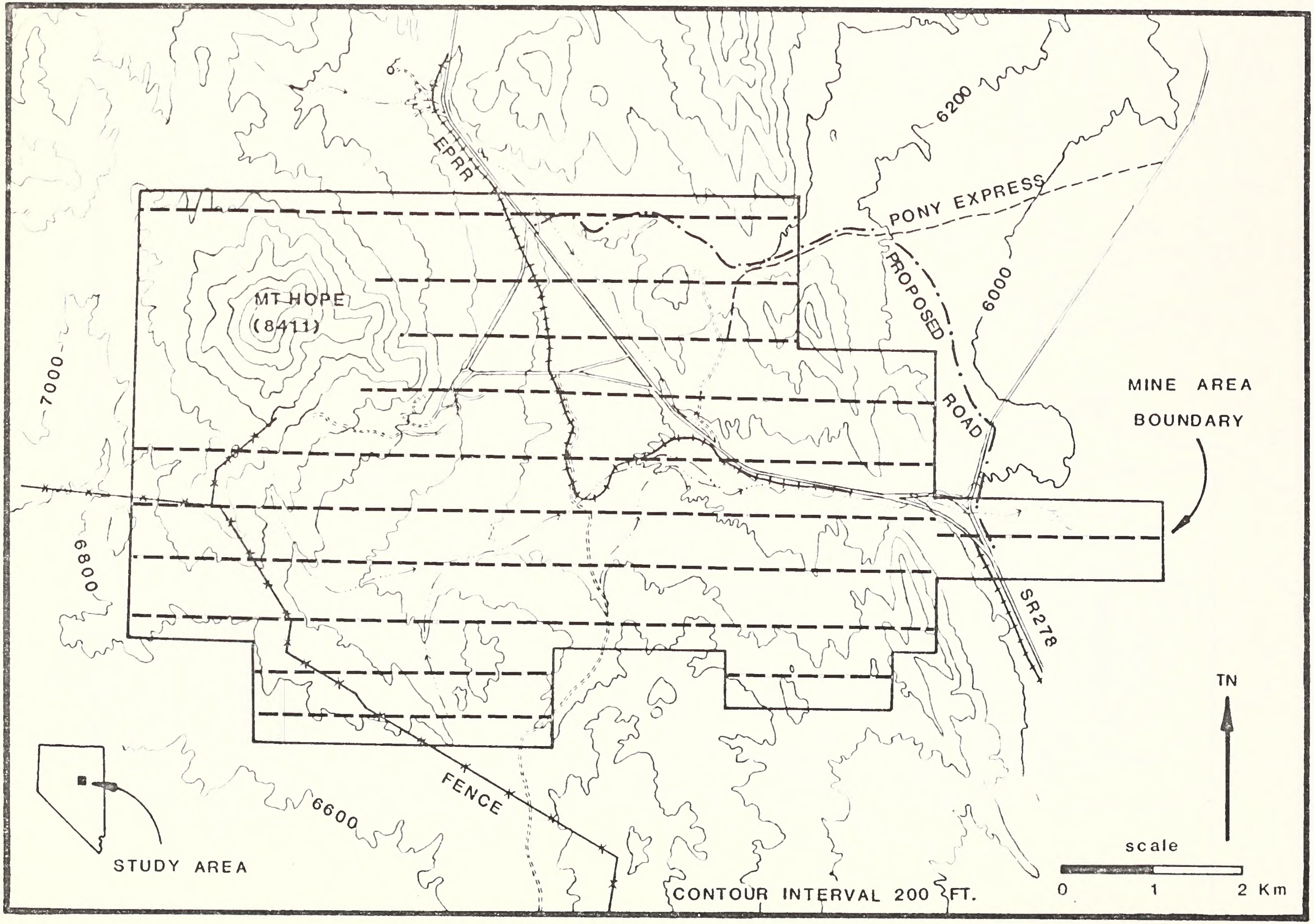

PONY EXPRESS
6200
6000
PROPOSED ROAD
MINE AREA BOUNDARY
EPRR
MT HOPE (8411)
7000
6800
6600
SR278
FENCE
TN
STUDY AREA
scale
0
1
2 Km
CONTOUR INTERVAL 200 FT.

Figure 5. Map of Mine Area with transect locations.

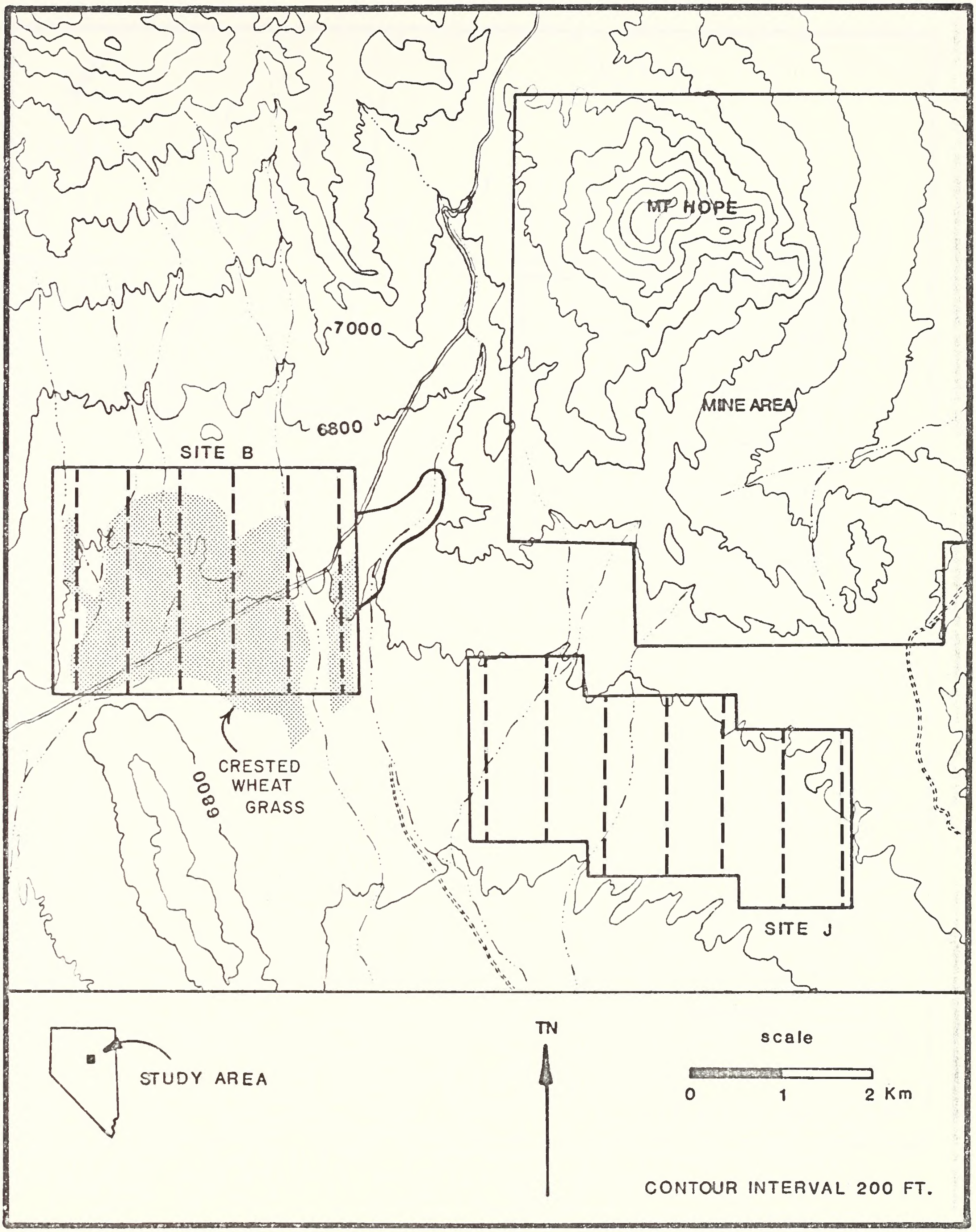

7000
MT HOPE
6800
MINE AREA
SITE B
CRESTED
WHEAT
GRASS
6800
SITE J
STUDY AREA
TN
scale
0
1
2 Km
CONTOUR INTERVAL 200 FT.

Figure 6. Map of Sites B and J with transect locations.

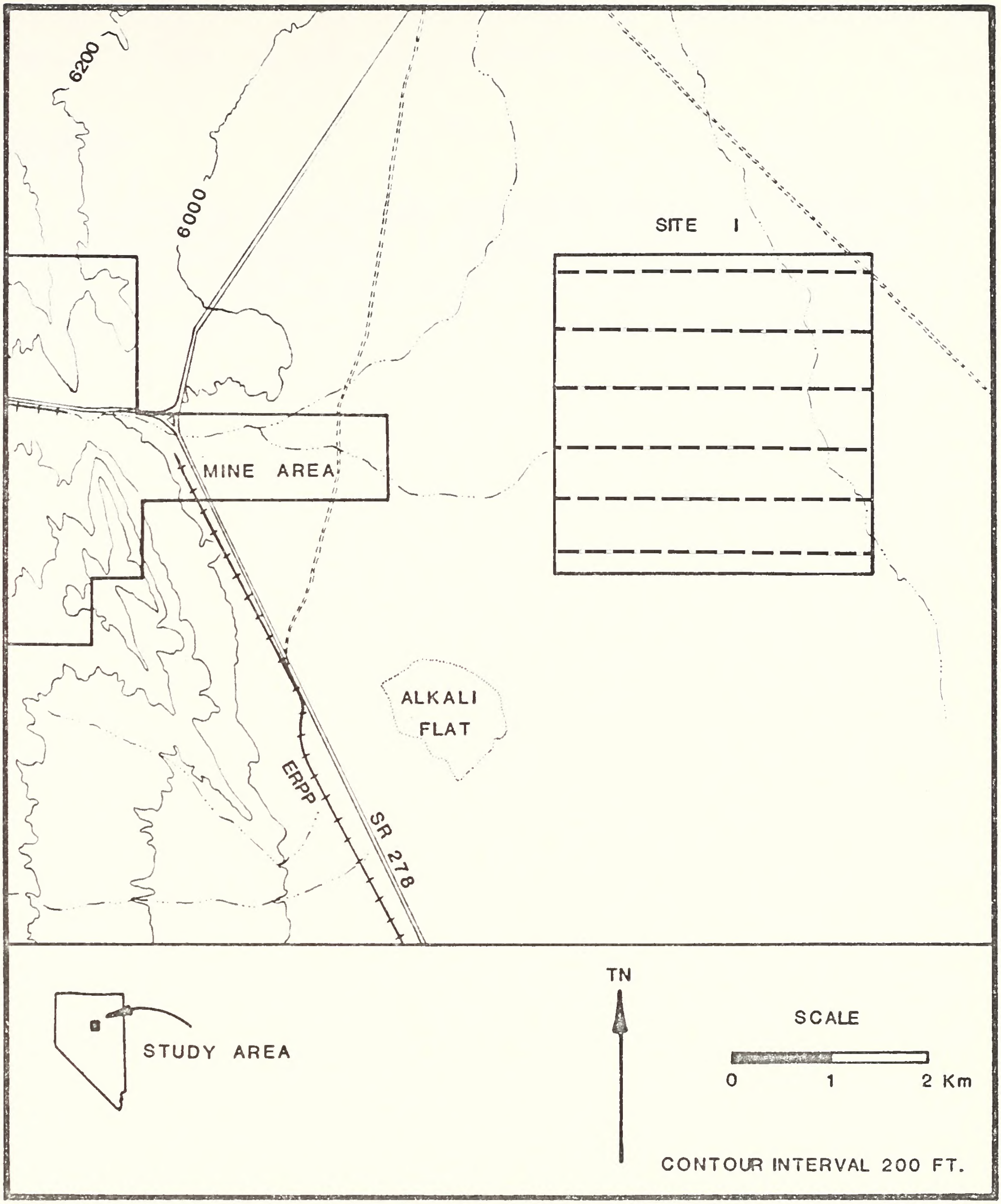

6200
6000
SITE I
MINE AREA
ALKALI FLAT
ERPP
SR 278
STUDY AREA
TN
SCALE
0
1
2 Km
CONTOUR INTERVAL 200 FT.

Figure 7. Map of Site I with transect locations.

Museum site number, a reference number, and a specimen number. Diagnostic projectile points were typed using Thomas' (1981) latest Great Basin projectile point key. Other artifacts were analyzed using appropriate reference materials.

Curation

All cultural materials collected during the survey will be curated at the Department of Anthropology Museum, University of Nevada, Reno. Site forms, photos, and maps have been sent to the Bureau of Land Management, Battle Mountain District and the Nevada State Museum.

SURVEY RESULTS

The archaeological survey of the Mt. Hope project area yielded a total of 65 sites and isolates, three of which had been recorded on earlier surveys (BLM 06-1403, -1445, -2682; NSM 26EU837, -800, -773, respectively). The other 62 sites were unrecorded prior to the survey. The 10% sample of the project area generated 52 sites, and 13 sites were recorded on the survey of the proposed reroute of State Highway 278, the Site B "arm", and south of the Mine Area. Thirty-seven of the sites and isolates are from the prehistoric period; 23 sites and isolates are historic; and 5 sites contain both prehistoric and historic components.

The site data collected during the survey is presented below. Rather than describing each site recorded, pertinent information about the sites is summarized in Tables 6 through 10. The discussion here focuses on the general patterns represented by the sites in each survey area, with descriptions of some of the more interesting sites.

Mine Area

The Mine Area is a large tract of land that is bounded by Mt. Hope on the west and the Sulphur Spring Range and a small portion of Diamond Valley on the east. With the exception of the Garden Pass Creek area and Diamond Valley, the Mine Area can be characterized as mountainous terrain with undulating ridges and hogbacks. Elevations range from 5900 feet in Diamond Valley to 8411 feet on the top of Mt. Hope. The majority of the area is covered by a pinyon-juniper woodland; sagebrush dominates the lower elevtions along Garden Pass Creek and the lower slopes of Mt. Hope (see Figures 1 and 2).

Forty sites and isolates were recorded in the Mine Area around Mt. Hope; half are prehistoric and half are historic. The

Table 6. Summary of Prehistoric Sites Recorded During the Survey of the Mine Area.

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26EU785	6904	P-J	Task	Isolate	----	Point fragment
26EU788	6560	P-J	Field Camp	8400	Archaic/ Numic	Elko and Desert Side-notched point, biface, mano stone circles(?); chert, obsidian, basalt flakes
26EU789	6660	P-J	Task	Isolate	---	Chert flake
26EU790*	6200	Sagebrush	Workshop	4600	Archaic	Elko Eared point; biface, core, flakes
26EU793	6040	Sagebrush	Task	4	---	Rock circle, flake
26EU795	6400	P-J	Task	Isolate	---	Utilized flake
26EU797	6520	P-J	Task	225	Archaic	Elko(?) point, chert flakes
26EU806	7040	P-J	Workshop	32,000	Archaic	Elko point frags, bifaces, chert flake
26EU807	7160	P-J	Task	400(?)	---	Chert flakes
26EU808	6950	P-J	Task	100(?)	---	Chert flakes
26EU809*	6960	P-J	Field Camp	4500	Archaic	Corner-notched arrow point, point fragments, drill, scraper, utilized flake, chert flakes
26EU810*	6720	P-J	Field Camp	1000	Archaic/ Numic	Rosegate series and Desert Side-notched points, point fragment, biface fragment, drill fragments, chert flakes
26EU812	6880	P-J	Task	Isolates	---	Chert and rhyolite flake
26EU814	6210	Sagebrush	Task	25	---	Chert flakes
26EU815	6830	P-J	Workship	1225	Archaic	Elko points, point fragment, bifaces, core, chert and basalt flakes
26EU820	6880	P-J	Task	Isolates	---	Chert and quartzite flake
26EU821	6980	P-J	Task	?	---	Chert flakes
26EU822	6980	P-J	Task	?	Archaic	Drill/corner-notched point fragment, chert flakes
26EU826	6540	P-J	Task	Isolate	---	Point tip fragment
26EU829	6240	Sagebrush	Task	Isolate	---	Chert flake
26EU830	6200	Sagebrush	Task	Isolate	Archaic	Elko point
26EU832	6160	Sagebrush	Task	Isolate	Archaic	Elko point

*Contains historic component

Table 7. Summary of Historic Sites Recorded During the Survey of the Mine Area

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Cultural Group	Cultural Remains
26EU787	6330	Sagebrush	Railroad Siding/Camp	750		Mt. Hope Station (?)--cans, bottles, stoneware, other debris
26EU790*	6200	Sagebrush	Railroad Camp	3500	Chinese	Chinese ceramics, buttons, cans, wood
26EU791	6280	Sagebrush	Debris	Isolate	-----	Bottle fragment, boot leather
26EU792	6160	Sagebrush	Habitation, Corral	800	-----	Bottle fragments, ceramics, cans, bones, stove parts
26EU794	6390	Sagebrush	Trail Debris	---	-----	Cans, wagon part(?), milled lumber
26EU796	6480	P-J/Sage	Charcoal Making	7500	Italian(?)	Charcoal pits, cans, bottles, button, barrel hoop
26EU798	6320	P-J/Sage	Debris	Isolate	-----	Bottle base with kickup
26EU799	6520	P-J/Sage	Cairn	---	-----	Rock cairn with axe cut poles
26EU809*	6920	P-J	Habitation, Charcoal Making	900	Italian(?)	Charcoal kiln, rock cairn, cans, buttons, bottles, other debris
26EU810*	6720	P-J	Charcoal Making	2500	Italian(?)	Charcoal lens, cans, bottles, crockery
26EU811	6770	P-J	Charcoal Making	200	Italian(?)	Charcoal lens, bitters bottle, wood pile
26EU813	6780	P-J	Debris	Isolates	-----	Cans, buckets
26EU816	6820	Sagebrush	Charcoal Making	24	Italian(?)	Charcoal lens, cans
26EU817	6490	Sagebrush	Woodcutting	Isolate	-----	Axe head
26EU818	6720	P-J	Charcoal Making	---	Italian(?)	Charcoal lens, can
26EU819	7140	P-J	Charcoal Making	---	Italian(?)	Charcoal lens
26EU823	6570	P-J	Charcoal Making	105	Italian(?)	Charcoal lens
26EU824	6440	P-J	Charcoal Making	?	Italian(?)	Charcoal lens, metal rake
26EU825	6920	P-J	Debris	Isolates	-----	Bottle base, 1/2 gallon can
26EU827	6460	P-J	Charcoal Making	48	Italian(?)	Charcoal lens
26EU831	6300	P-J/Sage	Woodcutting	200	-----	Axe cut wood pile

*Contains prehistoric component

Table 8. Summary of Prehistoric Sites Recorded During the Survey of Sites B, J, I, and South of Mine Area

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
SITE B						
26EU772	6640	P-J/Sage	Workshop	15,000	Archaic	Chert, obsidian, jasper and basalt flakes; scraper biface; utilized flakes; Large Side-notched and Elk points
26EU773	6560	Sagebrush	Quarry/ Workshop	70,000	-----	Chert and chalcedony cobbles and flakes; basalt flakes; utilized flakes
26EU774	6540	P-J/Sage	Workshop	10,000	-----	Chert flakes; scrapers
26EU775	6745	P-J/Sage	Task	Isolates	Archaic	Isolates--Humboldt and Rosegate(?) series points; chert flakes; possible stone circle
26EU776	6650	P-J	Workshop	10,000	Archaic	Large Side-notched point; cores; chert debitage
26EU777	6520	Sagebrush	Workshop	30,000	-----	Chert flakes
26EU780	6600	P-J/Sage	Task	750	-----	Point fragment; bifacial tool; scraper; utilized flake; flakes
SITE B "ARM"						
26EU778*	6600	Sagebrush	Task	----	-----	Chert flakes
26EU781	6685	Sagebrush	Task	600	-----	Utilized flakes; chert, obsidian, and basalt flakes
26EU782*	6700	P-J/Sage	Task	10	-----	Biface; chert flakes
SITE J						
26EU783	6440	Sagebrush	Task	Isolates	-----	Biface; chert flake
26EU803	6540	P-J/Sage	Task	2	-----	Chert flakes
SOUTH OF MINE AREA						
26EU801	6700	P-J/Sage	Task	1800	-----	Basalt chopper and core; chert, obsidian, basalt flakes
26EU802	6700	P-J	Task	Isolate	-----	Isolated basalt biface
26EU805	6660	P-J	Task	Isolate	-----	Biface fragment
SITE I						
26EU828	5851	Sagebrush	Task	Isolate	-----	Chert biface/point midsection

* Contains historic component

Table 9. Summary of Historic Sites Recorded During the Survey of Sites B, J, and South of Mine Area

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Cultural Group	Cultural Remains
SITE B "Arm"						
26EU778*	6600	Sagebrush	Debris	---	-----	Solder seam can
26EU779	6680	Sagebrush	Charcoal Making	50	Italian(?)	Charcoal lens
26EU782*	6700	P-J/Sage	Debris	10	-----	Glass bottle fragment, milled lumber
SITE J						
26EU784	6600	P-J/Sage	Fence Corral	40,000	-----	Juniper pole fence; brush corral; axe cut stumps
26EU804	6540	P-J	Campsite	---	-----	Stove pipe, cans, baling wire, button, bucket, cord wood, campfire rock alignment
SOUTH OF MINE AREA						
26EU800	6720	P-J	Charcoal Making	7500	Italian(?)	Charcoal pits/kilns; pole corrals; cans and glass bottles

*Contains prehistoric component

Table 10. Summary of Sites Recorded During the Survey of the Proposed Highway Reroute and McBride's Spring

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26EU833	6520	P-J	Task	Isolate	Archaic	Elko point
26EU834	6520	P-J	Field Camp	1600	-----	Shoshonean ceramics, point blank and tip fragments, biface, utilized flake, chert flakes
26EU835	6440	P-J	Field Camp	1200		Metate fragments; biface; chert, quartzite, and obsidian flakes; hearths/roasting areas (?)
26EU836	6480	P-J/Sage	Quarry	3750	Historic	Drilled holes in rock, cans, barrel hoops, milled wood
26EU837 McBride's Spring	6520	P-J/Sage	Field Camp	800	-----	Slab metates, manos, pestle, hammerstones; chert and basalt flakes, some historic debris

breakdown is as follows: 10 prehistoric sites, 9 prehistoric isolates, 13 historic sites, 5 historic isolates, and 3 sites containing both prehistoric and historic components. A summary of the sites recorded in the Mine Area is contained in Tables 6 and 7.

Some interesting patterns emerge from the data on the 22 prehistoric sites recorded in the Mine Area. In terms of vegetation zones, 73% (n=16) of the sites and isolates are situated in the pinyon-juniper woodland, whereas only 27% (n=6) are in the sagebrush zone. This distribution roughly reflects the relative amounts of these two plant communities within the study area. However, most of the larger and more complex sites are located in the woodland (see Table 6).

A variety of chipped stone artifacts was observed on the sites. These include projectile points and fragments, bifaces, drills, utilized flakes, scrapers, and cores. These are all tools which were employed in either hunting and butchering or in the manufacture and repair of hunting equipment. Chert was the preferred material type, although basalt and obsidian were also present. Tools for seed processing were limited to one mano from site 26EU788, and a sandstone metate isolate which was observed along side the road, but not formally recorded (off the transect) near site 26EU790. The only features observed were four problematical stone circles, one at site 26EU793, and three at site 26EU788. If these features are actually prehistoric structures, their size suggests that they are more likely to be caches than houses.

Diagnostic projectile points consist of eight Elko points, two Rosegate points, and two Desert Side-notched points. Based on these points, seven sites could be assigned to the Archaic period; two of these sites contain a Numic component as represented by Desert Side-notched points.

Sixteen (73%) of the prehistoric sites in the Mine Area are isolated artifacts or small scatters of artifacts covering fewer than 400 square meters. The artifacts in these small sites are all either isolated projectile points or small flake scatters, with or without points, left from the manufacture and/or repair of bifacial tools. The points probably represent hunting losses and the flake scatters may represent stations where hunters maintained their gear as they waited for game, or actual kill sites where butchering tools were sharpened.

Several sites are larger than 400 square meters and contain artifacts other than points and flakes. Some of these sites are undoubtedly field camps (26EU788, 26EU809 and 26EU810) because they contain seed processing implements or tools for the manufacture and repair of other tools. Three other sites, described below (26EU790, 26EU806, and 26EU815), are somewhat different in artifact content. It is perhaps no coincidence that four of the six larger prehistoric sites contain historic components, refelecting the fact that criteria for good camping places cross cultural and temporal boundaries.

The Mt. Hope Mine Site, 26EU788, is located adjacent to the Mt. Hope Mine on the eastern slope of Mt. Hope. The site lies within the transition between the sagebrush and pinyon-juniper zones and has an excellent view of Garden Pass Creek and the gap in the Sulphur Spring Range to the east. Mine tailings border the site and have probably obliterated a portion of it. A small creek which currently issues from the Mt. Hope Mine may have been the water source for the site during prehistoric times. Lithic materials on the site are composed primarily of basalt and obsidian; some chert and quartzite are also present. The artifact assemblage included a mano, and three projectile points: an untypeable midsection fragment, an Elko Corner-notched, and a Desert Side-notched (see Figures 12 and 14). Three problematic stone circles about 1.5 m in diameter were observed. These could represent the footings of brush shelters that have long since

decomposed, but their size is more suggestive of pinyon caches.

Site 26EU809 contains evidence of both prehistoric and historic occupation around a spring not indicated on the topo map. The site is situated in the pinyon-juniper woodland on a broad flat ridgetop formed by a southeastern spur of Mt. Hope. The prehistoric component is represented by a chert lithic scatter containing an obsidian corner-notched arrow point, several chert projectile point fragments, a drill, a scraper, and utilized flakes. No ground stone or prehistoric features were observed. The historic occupation consists of a charcoal kiln, rock cairn, solder seam cans, bottle fragments, a coffee pot, several buttons, and other debris.

In addition to the prehistoric material, site 26EU810 contains an historic component consisting of a charcoal lens, aqua glass fragments, hole-in-top cans and sherds of crockery. The prehistoric component included a Desert Side-Notched point, a Rosegate point, a drill, a biface and chert flakes.

Other sites (26EU790, 26EU806 and 26EU815) are large in area, but seem to be restricted in artifact content to points, bifaces, cores, and flakes from the reduction of cores and the manufacture and repair of bifaces. These sites are too large to have been generated by hunters on station, and it is unlikely that they represent reused kill sites since their locations do not appear to be particularly good places to drive or ambush game. Sites 26EU790 and 26EU806 are both in places where raw materials for flaked stone tool manufacture occur, and there well may be a source nearby site 26EU815. Thus, these sites functioned, at least in part, as workshops for the production of stone tools. While it is possible that some residential use was made of the sites, we hesitate to classify them as field camps since we found no evidence that prehistoric people actually camped at them.

Typeable projectile points from all three sites are in the Elko Series. Site 26EU790 is located on a ridge top near Tyrone Creek. The ridge top is covered by a dune partially stabalized by vegetation and it is possible that prehistoric materials are buried within the dune.

A total of 21 historic sites and isolates was recorded in the Mine Area; three have prehistoric components (see Table 7). Over half of the historic sites are connected to 1870s and 1880s charcoal production. These consist of ten sites with charcoal pits or lenses, and two woodcutting sites. The charcoal features are typically circular or oval in plan view, some as large as 20 meters in diameter. In profile, they are lens-shaped (thicker in the middle and thinner toward the edges), as much as a meter or more thick in the middle, and composed of charcoal and soil. It appears that wood was piled on the ground (in some cases placed in a shallow pit), covered with soil, and fired. When the firing was complete, the larger pieces of charcoal were raked out of the pile. Several of these features can be seen in color air photos of the project area. Based on the historical record, these sites are inferred to have been the work of Italian Carbonaris, although no evidence of any particular ethnicity was found at the sites.

The other nine historic sites include a habitation area and corral (26EU792), a rock cairn (26EU799), two camps along the Eureka and Palisade Railroad grade (26EU787 and 26EU790), debris associated with an old road (26EU794), and four isolated finds (26EU791, 798, 813, and 825).

The two historic sites along the railroad are particularly interesting. Site 26EU787 is a railroad siding with an associated habitation area, located about a mile east of the Mt. Hope Mine on the dismantled Eureka and Palisade Railroad. Cultural materials consist of a dense scatter of cans, bottle fragments, procelain, and other debris. Most of the trash

appears to date from the turn of the century to the 1930s. That the site is a railroad siding is indicated by two parallel sets of railroad ties that are still in situ. The site may be the Mt. Hope Station referred to in the historic literature (see Vanderburg 1938).

The other railroad-related site (26EU790) contains both prehistoric and historic materials. It is situated on a sagebrush covered ridge overlooking Tyrone Creek to the south. The prehistoric component is described above. Historic materials include hole-in-top cans, rectangular tin cans, ironstone ware, Chinese brown glaze earthenware used for food storage and soy sauce, and sherds from several Chinese stoneware or "Swatow" food bowls. The presence of Chinese ceramics suggests that the historic occupation of the site represents a Chinese railroad workcamp dating from the 1875 construction of the Eureka and Palisade Railroad.

Site B

This alternative tailings pond area lies to the southwest of the Mt. Hope Mine Area. The terrain is fairly level and dissected by ephemeral drainages that run southward; the elevation of Site B averages about 6600 feet. The vegetation is dominated by sagebrush with scattered juniper and occasional pinyon. However, much of Site B is in a crested wheat planting (see Figure 6). Crested wheat is usually planted with a rangeland drill, a gang of discs dragged by a large tractor. The crested wheat planting in Site B occurs in the central portion, with a band of undisturbed ground around the edges. Air photos show that small stands of pinyon-juniper woodland, rocky outcrops, and steep stream banks were undisturbed by the planting. Archaeological survey on the Saval Ranch north of Elko, Nevada (Crittenden and Elston 1981), has shown that crested wheat planting with the rangeland drill obliterates prehistoric surface artifact scatters. It is no coincidence, then, that all cultural

remains found within site B were outside the crested wheat seeding.

In addition to the 10% sample in the rectangular "regularized" area of Site B, we walked up and down the major stream which drains the area from Henderson Summit south past the east side of Site B. An "arm" of Site B will extend about 1 kilometer up this drainage (see Figures 2 and 6). Our survey of the Mine Area indicated that site density would be high and we wanted to test this hypothesis.

A total of seven sites was recorded in the 10% sample of Site B. The prehistoric sites are all lithic scatters which range in size from 10 sq. m to as large as 70,000 sq. m (see Table 8). Although several of the lithic scatters are quite large, none contained the variety of tools expected for residential use, and none are classified as field camps. Site 26EU773 is apparently a quarry site where toolstone was procured and initially reduced, while sites 26EU772, 26EU774, 26EU776, and 26EU777 are lithic workshops. The remainder are task sites, smaller in area than 750 square meters.

Tools observed on site 26EU772 include large side-notched projectile points, bifaces, a unifacial scraper, utilized flakes, and flakes of chert, obsidian and basalt. No cores were seen, but there are chert primary reduction flakes which suggests that a source of raw material is not too far from the site. Artifacts at quarry site 26EU773 are confined to debitage and utilized flakes. Artifact assemblages from the remaining sites contain various combinations of flakes, points, bifaces, utilized flakes, and scrapers. In fact, utilized flakes and scrapers are found more often in Site B sites than in Mine Area sites. This suggests that these sites were used for some activity for which scraping was important, but we do not know exactly what that activity was. Since projectile points and bifaces are present, we suspect that it involved hunting; in this terrain, the likely

prey would have been deer or antelope.

Diagnostic projectile points include Side-notched (probably Elko), Humboldt, and Rosegate , and indicate Archaic period occupation.

Three prehistoric sites were found in the Site B "arm". Site 26Eu781 is a small lithic scatter with chert, obsidian and basalt debitage and utilized flakes. Sites 26Eu778 and 26Eu782 are very small lithic scatters which also contain small historic components.

The historic sites in the "arm" of Site B (see Table 9) are all small. Two consist of one or two items of historic debris discarded on two prehistoric sites (26EU778 and 26EU782); this is further support for the notion that some places are attractive to humans regardless of culture or time. The third historic site (26Eu779) is a charcoal lens representative of the charcoal production activity which occurred in the area during the 1870s and 1880s.

Site J

Site J is situated south of the Mine Area beteen 6600 and 6400 feet in elevation. Although it is similar in elevation to Site B, it is not as flat and it is more dissected by ephemeral drainages. Site J also contains pinyon-juniper woodland, which occurs on hills and ridges between the major drainages in the northern half of the area; the remainder is sagebrush.

The 10% sample of Site J located four archaeological sites. The prehistoric sites consist of a very small scatter of chert flakes (26EU803) and an isolated find (26EU783), both classified as task sites (see Table 8). The two historic sites are a fence and brush corral (26EU784), and a small campsite (26EU804).

Site 26EU784 consists of a segment of juniper pole fence which spans a narrow drainage and runs uphill a short distance. One strand of wire is attached to a pole. A small, low corral or enclosure of juniper branches lies about 200 m from the fence (Figure 8); axe cut stumps are in the vicinity of the site. Site 26EU804 is a small historic campsite with stovepipe, cans, wire, a shell button, campfire ring, and other debris.

Area South of Mine Area

Several sites were discovered between the Mine Area and Site B. Sites 26EU801, 26EU802 and 26EU805, all prehistoric, were found when the crew was surveying in Site J and inadvertently extended two transects too far north. Site 26EU800, an extensive historic site, was discovered while driving to Site J from the Mine Area; it lies astride the main road south from the Mount Hope Mine.

Sites 26EU802 and 26EU805 are isolated bifaces. Site 26EU801 is a lithic scatter containing chert, obsidian and basalt flakes, along with a basalt chopper and a basalt core.

Site 26EU800 is a large historic site, consisting of two corrals, four charcoal kilns, two lenses, and one pit that appear to represent various stages in charcoal production, and scatters of historic debris. Three kilns are rectangular in shape, filled with charcoal and soil, and have limestone slabs piled along one side (Figure 9). Two of these kilns seem to be lined with several upright, charred juniper or pinyon posts. The fourth kiln is filled with charcoal and partially covered with limestone blocks, some of which are burned. It looks like the kiln was abandoned before the charcoal was removed from it. Two charcoal lenses similar to those described previously are present, as is a dug-out pit with mounded spoil dirt on the sides and a stack of logs piled nearby. It looks as though the pit is a kiln that was

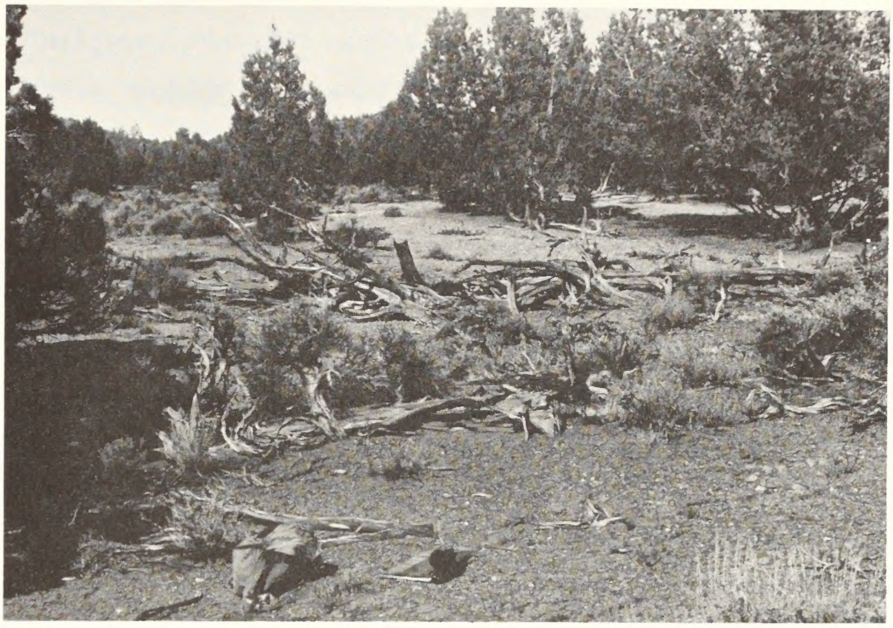


Figure 8. Brush corral at Site 26EU784.

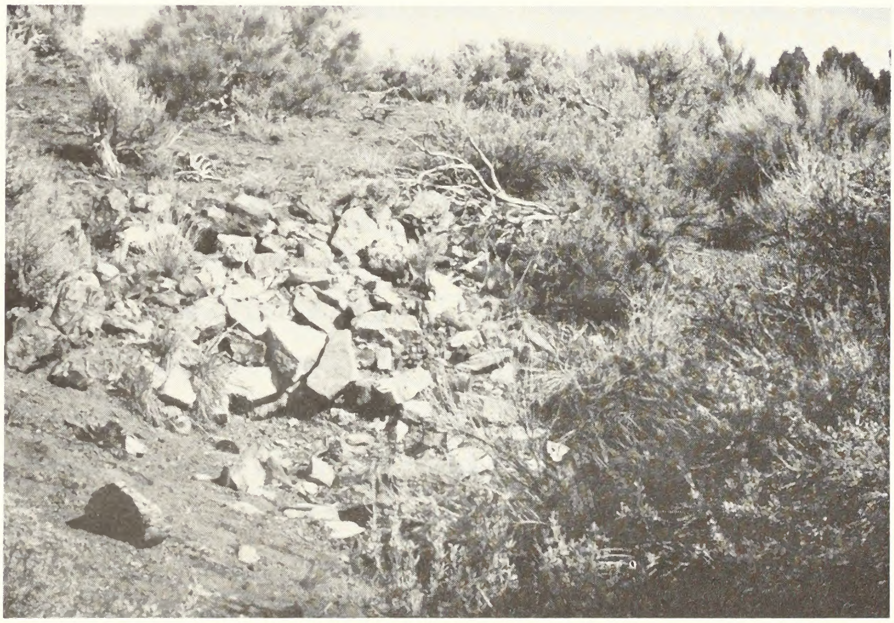


Figure 9. Charcoal pit/kiln at Site 26EU800.

dug, but never used. Broken bottles, cans, and other debris lie about the site. North of the charcoal features are the remains of two juniper/pinyon corrals. One of the corrals is still standing; the other has mostly collapsed.

The site lies astride the main road from the north, which extends from the Eureka and Palisades Railroad near the Mount Hope Station or siding (26EU787), makes a loop through the pinyon-juniper woodland south of the Mine Area, and reconnects with the Railroad in Diamond Valley east of Stinking Spring.

Charcoal production took place at the site, but using a technique different from that employed elsewhere. The rectangular pits lined with posts and covered with soil and limestone blocks are very different from the circular pits and lenses covered with soil observed throughout the study area. The rectangular pits may have something to do with making charcoal from juniper and mountain mohagany, both of which require higher temperatures than pinyon. It is possible that site 26EU800 functioned as a supply point for charcoal crews, a livestock yard, and a central collection point for charcoal produced in the surrounding area, for transportation to the railroad and the mines at Eureka.

Site I

Site I is located on the western edge of Diamond Valley, just east of the Mine Area. The terrain here is flat and averages about 5850 feet elevation; vegetation is dominated by sagebrush. Gravel bars and other shore features from ancient Lake Diamond can be seen in air photos of the western part of Site I.

The 10% sample of the site yielded only one archaeological site (26EU828). This task site is an isolated chert biface fragment which may represent a projectile point midsection (see Table 8).

Highway Reroute

During the fieldwork, a survey was conducted of a proposed reroute of a portion of State Highway 278. As the reroute has not been finalized, this survey represents a preliminary examination for planning purposes in order to determine the number and type of archaeological sites that can be expected in this area.

The proposed reroute begins from the Diamond Valley Road, about .5 mile north of its intersection with Highway 278. The reoute runs north northeast about 1.25 miles along the sagebrush covered alluvial slopes. Just east of a large gap in the ridge of the Sulphur Spring Range, the reroute intersects the Pony Express Trail, and turns west along the trail through the gap, then meanders west northwest for about 2.5 miles to intersect with Highway 278. Between the gap and the highway, the reoute runs through or adjacent to relatively dense stands of pinyon-juniper woodland.

Four archaeological sites are located in the vicinity of the proposed reroute. Three are prehistoric sites; one is historic (see Table 10). Although the proposed highway follows a portion of the Pony Express Trail, no historic sites were observed in this area. An isolated historic bottle fragment (26EU798) was, however, recorded on the trail during the transect sampling survey of the Mine Area.

The prehistoric sites are an isolated Elko projectile point (26EU833), and two field camps (26EU834 and 26EU835). A variety of cultural materials was observed at these sites. Site 26EU834 is a light lithic scatter situated on a low ridge above an ephemeral drainage in the pinyon-juniper woodland. Artifacts on the site included a single Shoshoni Brownware rim sherd, projectile point tip fragments, a point blank, a biface, and

utilized flakes. Site 26EU835 lies on the east side of a ridge that overlooks Garden Pass Creek to the west. The site consists of a light scatter of lithic debitage, mostly chert. Tools include several metate fragments and a white chert biface fragment. Two charred areas on the site may represent hearths or pinyon roasting areas or they could be of natural or historic origin.

The two historic sites on the highway reroute are a charcoal making camp (26EU796) and a historic quarry (26EU836). The charcoal making site was recorded during the survey of the Mine Area and is described above. The site is mentioned here because it is situated adjacent to the proposed reroute.

Site 26EU836 represents historic quarrying around a large, granitic-like outcrop located near Garden Pass Creek. The site contains numerous large, irregular blocks that have been cut away from one face of the outcrop. Many of the blocks have been piled around the outcrop. Rows of drill holes are visible along the edges of the blocks, sometimes on several sides of the same block. Several hole-in-top cans, a lard bucket, wood fragments, and barrel hoops are in the area. The rock at the quarry appears to be too friable for building stone. It may have served as fill for the Eureka and Palisade Railroad grade or for a road.

McBride's Spring

Site 26EU837 is a small but dense scatter of tools and flakes situated near McBrides Spring. The site is outside both the proposed highway reroute and the Mine Area, but close enough to sustain impacts if care is not taken to avoid it. This site was recorded by the BLM as CRNV-06-1403; additional data on site content was collected during the present survey. Artifacts include several sandstone slab metates, several mano fragments, a pestle, and four battered hammerstones. Some historic debris is on the site, but may not necessarily be associated with the aboriginal occupation.

Diagnostic prehistoric and historic artifacts were collected from several sites and isolated locations in the study areas. The debitage from several small lithic scatters containing diagnostic artifacts was also collected in accordance with BLM guidelines (BLM 1982). Descriptions of these artifacts and their inferred chronological placement is presented in this section; Table 11 is a list of collected materials.

Prehistoric Artifacts

Projectile Points. Points were typed using Thomas' (1981b) revised Great Basin projectile point key. Of the fourteen points recovered, most were complete enough to be typed. Several fragments which could be typed only tentatively are described, as are points which were not collected but which were typed from field drawings. Attributes of the points are given in Table 12; Figures 10 through 13 are point illustrations.

Large Side-notched points: There were two points collected of this type, one of semi-opaque white chert (catalog number 26EU772-1-4) and one of mottled red jasper (26EU776-1-1). These points might formerly have been designated Northern Side-notched, Elko Side-notched, or Rose Spring Side-notched; however, Thomas (1981b:30) has reconsidered these classifications in the latest revision of his key: "Both Elko and Rose Spring Side-notched categories should be dropped as there is no stratigraphic or morphological evidence to support their existence [as diagnostic types]." Although the temporal span of these points is not well-documented at present, the large side-notched points in the Mt. Hope collection are probably mid-Archaic dart points dating between 2000 B.C. and A.D. 500.

Humboldt Series. One Humboldt Series projectile point was collected. This artifact (26EU775-1-4) is made of white chert and

Table 11. List of Cultural Materials Collected.

Site No.	Projectile Points	Biface	Flake Tools	Drill	Debitage	Pottery	Historic	Entire Site Collected?
26EU772	1 White chert LSN		1 basalt modified flake		10 White to translucent chal. flakes 1 Red jasper flake			No
26EU775	1 Pink chal. RGS? medial fragment 1 White chert HS				3 gray thermally altered flakes 1 Red chal. flake			Yes
26EU776	1 Mottled red jasper LSN							Yes
26EU783		1 Red jasper preform complete			1 chert flake gray with inclusions			Yes
26EU788	1 Obsidian DSN 1 Basalt ECN	1 Basalt large broken & battered edges crushed						No
26EU790	1 Obsidian EE							No
26EU797	1 Gray chert ECN? midsection				5 Chert white thermally altered flakes 2 Chert white with inclusions			Yes

Table 11 (Continued).

Site No.	Projectile Points[1]	Biface	Flake Tools	Drill	Debitage	Pottery	Historic	Entire Site Collected?
26EU810	1 beige chert RGS 1 Red chert RSG? tip 1 White chert DSN	1 White chert thermally altered fragment 1 Gray chert lateral edge fragment		1 White Chert potlidded point, broken	8 Mottled white chert with inclusions 2 Mottled grey-beige flakes 1 White flake 1 White thermally altered flake			Prehistoric component entirely collected; No Historic collected
26EU811							1 Brown glass glass bottle "Hostetters Bitters" 2 piece mold, applied neck & lip	Yes
26EU830	1 Gray chert ECN							Yes
26EU832	1 Gray chert ECN							Yes
26EU833	1 Pink chert ECN							Yes
26EU834						1 Shoshoni Brownware rimsherd		Yes
Total	14	4	1	1	35	1	1	

Table 12. Projectile Point Attributes

Type	Site No.	Spec. No.	Material	Portion	L_S	L_T	L_A	L_M	W_M	W_B	TN	Wt.	Est. Wt.	N_W	DSA	PSA	DSA-PSA	(BIR)	L_T/W_M	W_B/W_M	Max. Wpos.	Comments
LSN	26EU772	4	Chert	Base	26.8	(37.5)	(33.9)	—	(19.3)	(19.3)	5.0	2.4	2.6	10.7	195	160	35	.90	1.94	1.00	—	
EE	26EU772	NC	Chert	Base/Mid	29.6	(34.9)	(31.0)	—	(19.9)	(17.)	—	—	2.3	9.1	189	130	59	.89	1.75	.85	—	Battered
LSN	26EU772	NC	Chert	Base	24.8	(31.8)	(29.7)	—	(15.1)	(14.8)	—	—	2.0	7.1	170	168	2	.93	2.11	.98	—	Base
ECN	26EU772	NC	Chert	Complete	37.6	37.6	35.9	—	19.8	18.8	—	—	3.2	16.3	234	118	116	.95	1.90	.95	—	
RGS	26EU775	3	Chal.	Shoulder	15.1	(29.5)	(29.5)	—	(19.8)	(9.0)	3.8	1.2	2.0	8.0	136	84	52	1.00	1.49	1.00	—	Incomplete
HS	26EU775	4	Chert	Base	34.9	(39.6)	(38.0)	17.3	15.2	11.9	5.5	3.0	3.1	—	—	—	—	.96	2.61	.78	.44	Resharpened
LSN	26EU776	1	Jasper	Base	31.5	(40.5)	(37.1)	—	15.6	15.6	4.8	2.2	2.3	8.4	194	153	41	.92	2.58	1.00	—	
DSN	26EU788	1	Obsidian	Complete	15.4	15.4	15.4	—	11.8	11.8	2.6	.4	—	7.9	198	176	22	1.00	1.31	1.00	—	
ECN	26EU788	2	Basalt	Base	26.4	(43.6)	(42.3)	—	21.2	20.3	5.4	3.3	3.8	11.8	194	145	49	.97	2.06	.96	—	
EE	26EU790	1	Obsidian	Complete	29.1	29.1	26.9	—	19.1	13.8	5.7	2.8	3.1	11.9	220	123	97	.92	1.52	.72	—	Battered
ECN?	26EU797	3	Chert	Base	23.6	(47.2)	(47.2)	—	(20.0)	(10.1)	4.1	1.6	3.2	9.0	154	(110)	44	1.00	2.36	.47	—	Incomplete
RGS	26EU810	8	Chert	Base	12.5	(22.1)	(22.1)	—	(20.0)	9.6	3.0	.7	1.2	7.3	144	118	26	1.00	1.10	.48	—	Incomplete
RGS?	26EU810	9	Chert	Tip	27.7		—	—	16.9	—	3.8	1.5	2.5	—	—	—	—	—	—	—	—	Incomplete
DSN	26EU810	10	Chert	Base	21.5	(33.6)	(33.6)	—	13.5	13.5	3.7	1.8	2.5	7.1	193	172	21	1.00	2.49	1.00	—	Incomplete
ECN	26EU815	NC	Chert	Base	26.7	(43.3)	(43.3)	—	21.9	15.0	—	—	3.5	10.9	157	136	21	1.00	1.98	.68	—	
ECN	26EU815	NC	Chert	Base/Mid	27.6	(36.4)	(35.3)	—	22.3	(12.6)	—	—	2.9	10.4	142	126	16	.97	1.63	.57	—	
ECN	26EU830	1	Chert	Base	22.1	(51.5)	(51.5)	—	(24.9)	16.9	4.5	2.7	4.7	13.5	167	114	53	1.00	2.07	.68	---	Incomplete
ECN	26EU832	1	Chert	Base	26.5	(42.7)	(41.1)	—	23.5	16.8	3.8	2.7	3.8	15.1	199	112	87	.96	1.82	.71	—	Incomplete
ECN	26EU833	1	Chert	Complete	30.5	30.5	30.5	—	21.9	(20.2)	4.1	2.7	3.0	14.3	201	131	70	1.00	1.40	.92	—	Battered

Measurements are in millimeters and grams; numbers in parentheses are estimated

Abbreviations:

Type: LSN - Large Side-notched; HS - Humboldt Series; ECN - Elko Corner-notched; EE - Elko Eared; RGS - Rosegate Series; DSN - Desert Side-notched;

Spec. No. - Specimen Number; L_S - Actual Length; L_T - Total Length; L_A - Length of Longitudinal Axis; L_M - Length from Proximal End of Point to the Maximum Width; W_M - Maximum Width; W_B - Basal Width; TN - Thickness; Wt. - Weight in Grams; N_W - Neck Width; DSA - Distal Shoulder Angle, between 90°-270°; PSA - Proximal Shoulder Angle, between 0°-270°; BIR - Basal Indentation Ratio, L_A/L_T; MaxWpos - Maximum Width Position, L_M/L_T x 100; NC - Not Collected; Chal. - Chalcedony

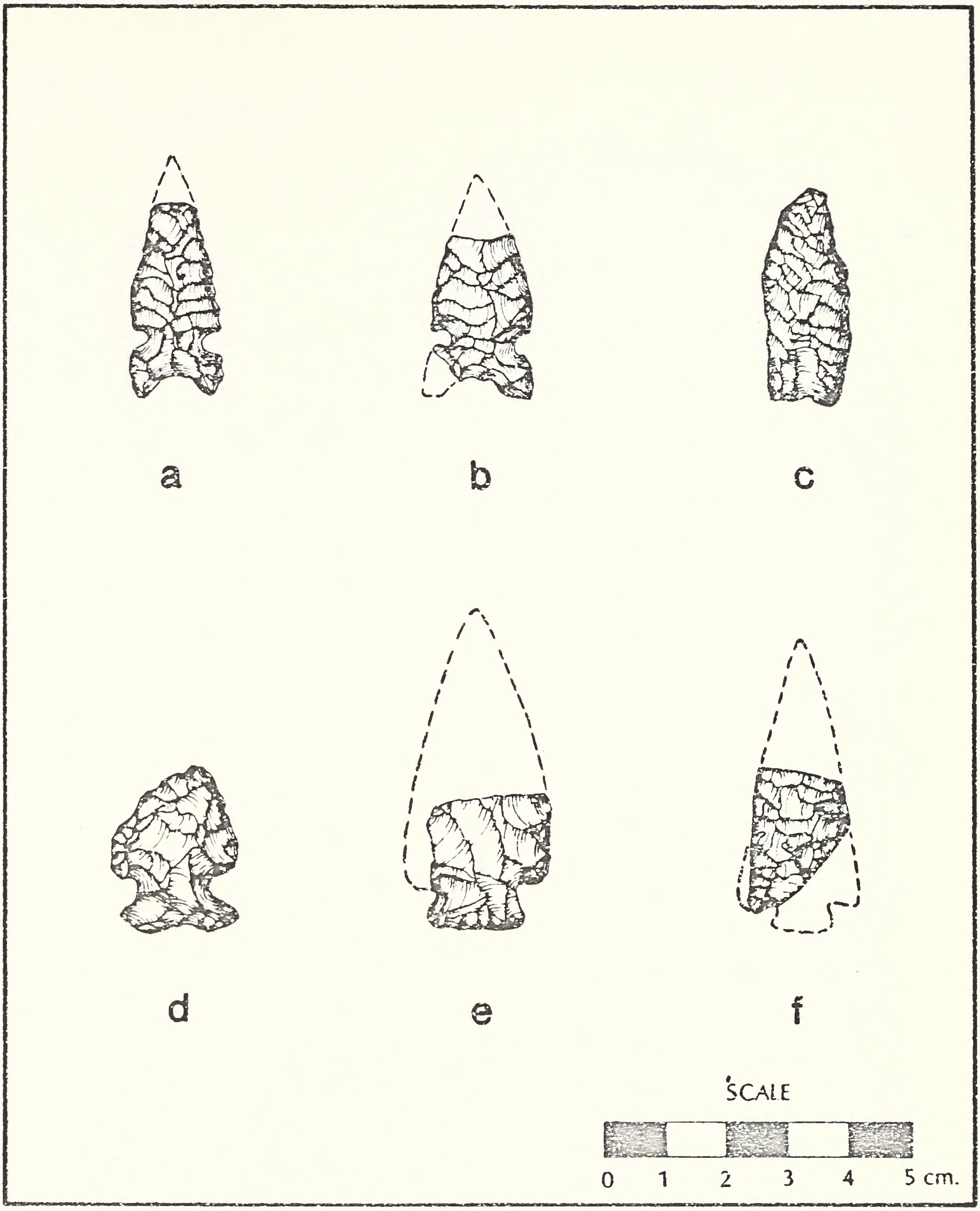

a
b
c
d
e
f
SCALE
0
1
2
3
4
5 cm.

Figure 10. Projectile points. Large Side-notched: a. 26EU776-1, b. 26EU772-2; Humboldt Series: c. 26EU775-4; Elko Corner-notched: d. 26EU788-2, 3. 26EU830-1, f. 26EU797-3.

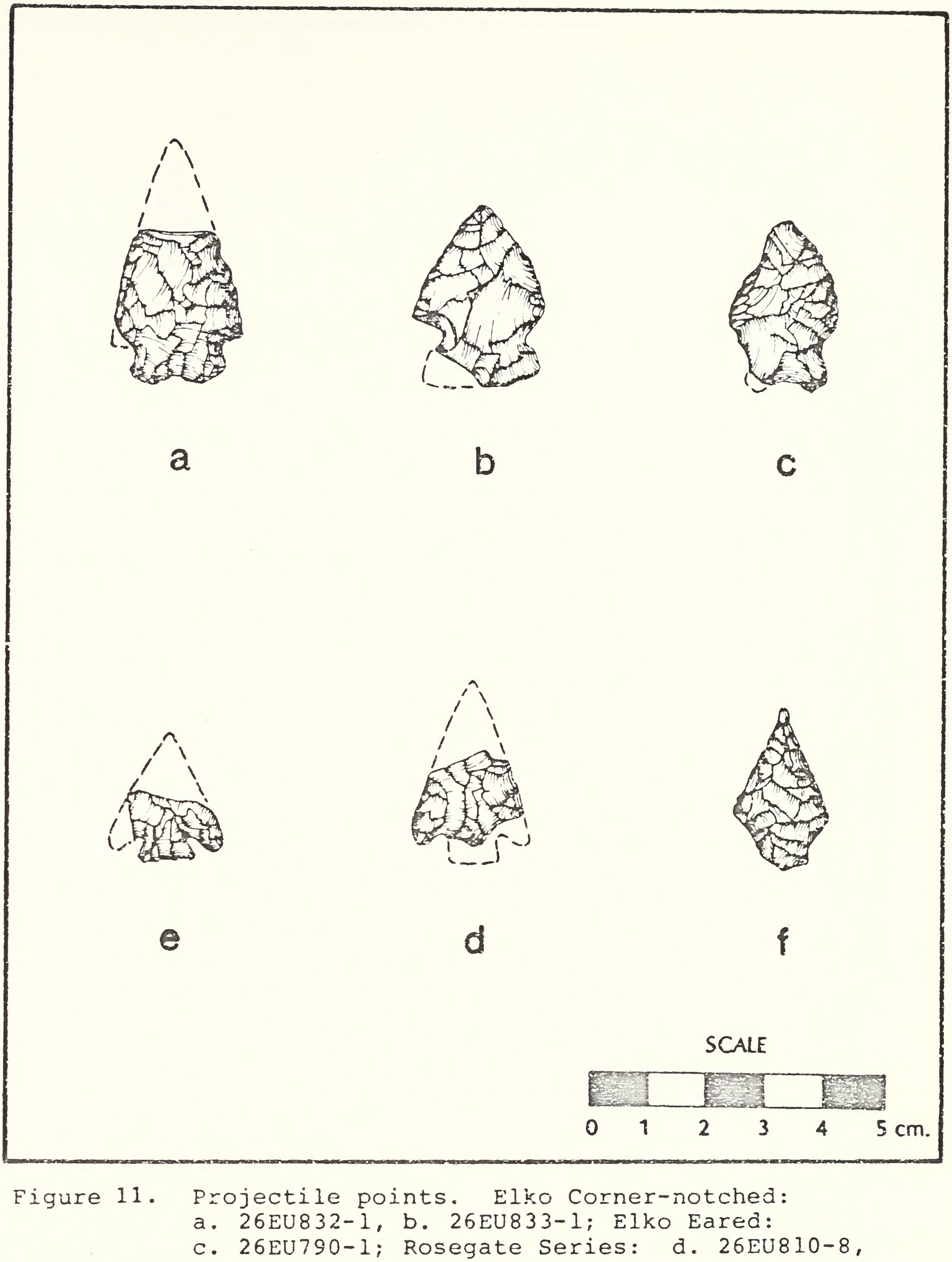

a
b
c
e
d
f
SCALE
0
1
2
3
4
5 cm.

Figure 11. Projectile points. Elko Corner-notched: a. 26EU832-1, b. 26EU833-1; Elko Eared: c. 26EU790-1; Rosegate Series: d. 26EU810-8, 3. 26EU775-3, f. 26EU810-9.

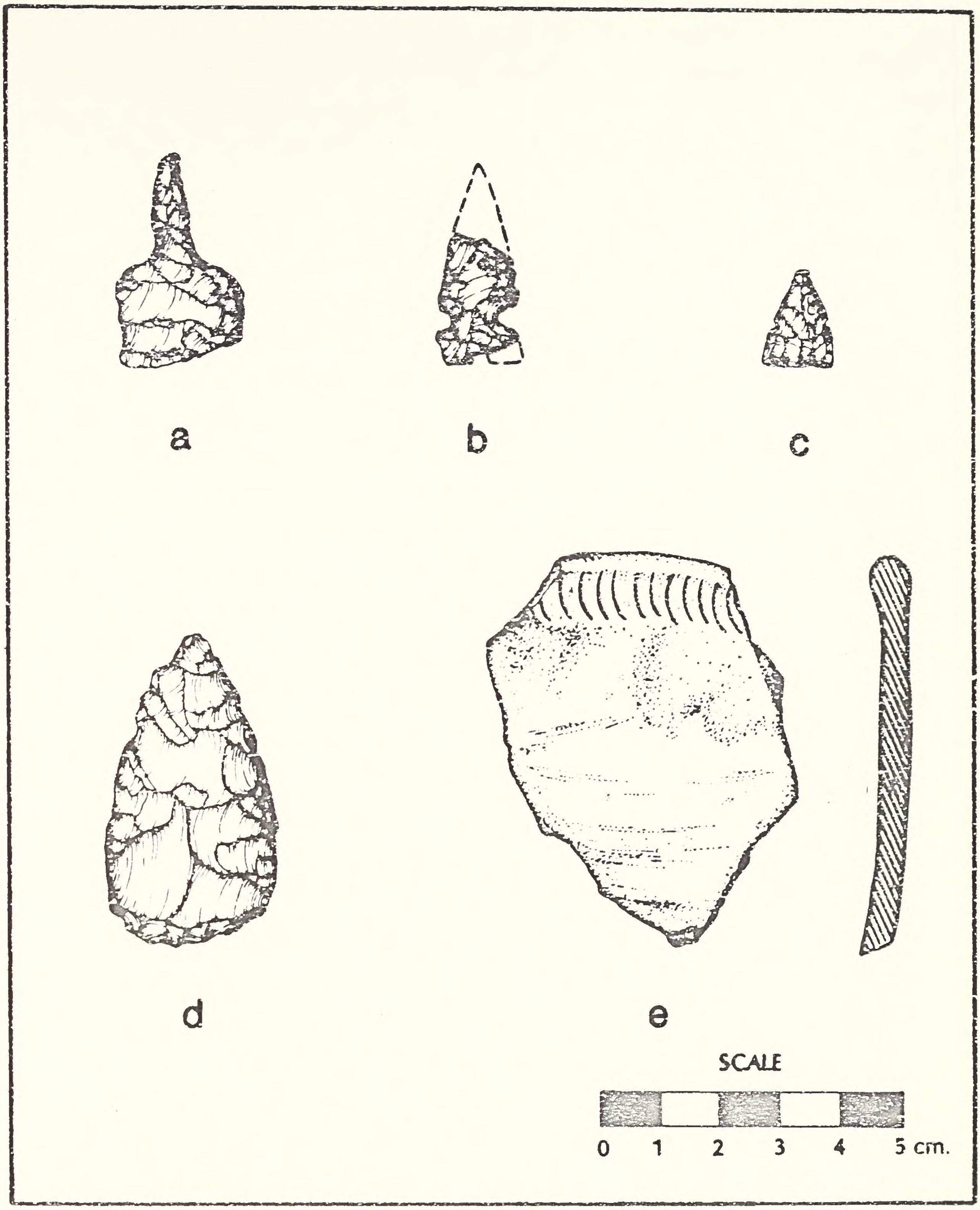

a
b
c
d
e
SCALE
0 1 2 3 4 5 cm.

Figure 12. Drill, projectile points, biface, and pottery. a. Drill: 26EU810-6; b,c. Desert Side-notched points: 26EU810-10, 26EU788-1; d. Biface: 26EU783-2; e. Shoshoni Brownware: 26EU834-1.

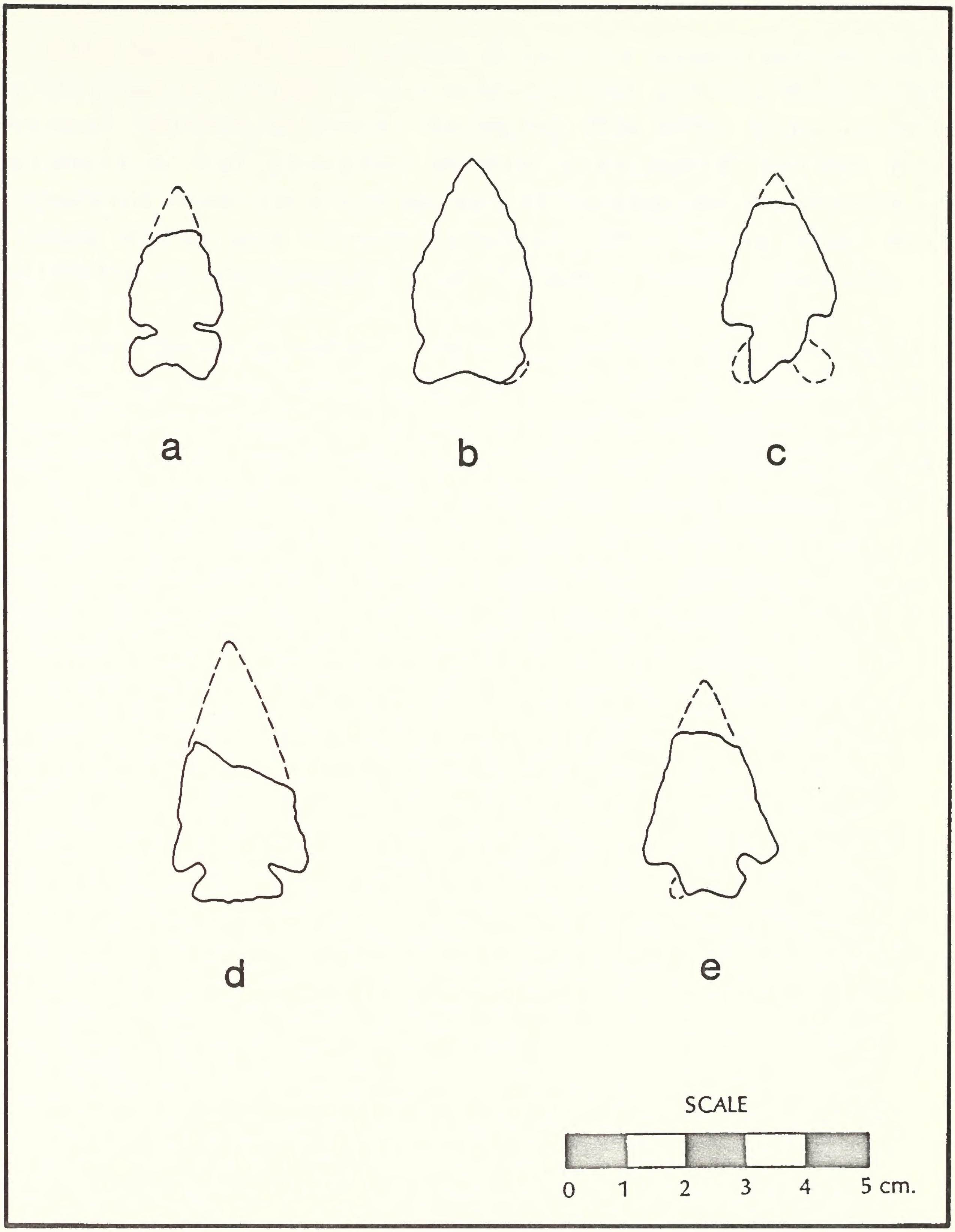

a
b
c
d
e
SCALE
0
1
2
3
4
5 cm.

Figure 13. Projectile points
Large Side-notched: (a) 26EU772; Elko Eared: (b) 26EU772;
Elko Corner-notched: (c) 26EU772, (d-e) 26EU815.

dates from 3000 B.C. to A.D. 700.

Elko Series: A total of six projectile points was recovered for this series, five Elko Corner-notched and one Elko Eared. Although Thomas proposes dropping the Elko Side-notched designation and grouping points previously called Elko Contracting Stem into the Gatecliff series, he discriminates between Eared and Corner-notched, indicating that this distinction is morphological, not temporal (Thomas 1981b:21).

Elko Corner-notched points in the Mt. Hope collection include one basalt base (26EU788-1-2); one gray chert basal fragment which appears thermally altered (26EU830-1-1); one grayish-colored chert base fragment also thermally altered (26EU832-1-1), and one pink chert basal fragment (26EU833-1-1). The fifth specimen is a midsection of gray chert with one tang intact (26EU797-1-3). Classification of the latter is problematical as the stem is missing; however, due to its relatively large size, it was typed as an Elko series point. The single Elko Eared point (26EU790-1-1) is of obsidian and has one broken tang. Thomas (1981b) dates Elko series points in the central Great Basin from 1300 B.C. to A.D. 700.

Rosegate Series: One point for this classification (26EU810-1-8) was collected, a basal fragment of beige chert. The Rosegate point type is a combination of two previously recognized Great Basin types, Rose Spring and Eastgate (cf. Thomas 1981b:19), and is temporally diagnostic of the period A.D. 700 to A.D. 1300.

Of two small, incomplete points recovered, one (26EU775-1-3) is a medial fragment of pink chalcedony with one tang but no portion of the stem present; the other (26EU810-1-9) is a distal fragment of red chert, with very little of the base present. These two points cannot be typed with certainty, but, based upon their small size and what relict evidence is present, they appear

to be Rosegate series points.

Desert Series: Two Desert Side-notched points were recovered. One (26EU788-1-1) is a small, complete obsidian point; the other (26EU810-1-10) is a proximal fragment of white chert. The latter has a small basal notch which is often characteristic of the type. This incomplete specimen weighs 1.8 grams, with an estimated weight of at least 2.0 grams. In Thomas' (1970) original key, the cutoff weight for Desert Side-notched points was 2.0 grams, and in the latest version, it is 1.5 grams, suggesting the fragment belongs in the Elko Series. This presents a difficulty with the key, because the artifact exhibits classic traits for the Desert Series but types as Elko based upon a trait which is estimated. We have arbitrarily typed the item as Desert Series. Desert Side-notched points are dated between A.D. 1300 and A.D. 1850 and are representative of the Numic peoples who occupied the great basin at the time of historic contact.

Bifaces. Two complete bifaces and two biface fragments were recovered during the survey. 26EU783-1-2 is a complete red jasper biface, roughly triangular, with a rounded base (Figure 12d). It is 50.7 mm in length, 29.4 mm in width, 5.6 mm in thickness, and weighs 8.4 grams. The jasper is shot with a milky white streak at the center just above a band of grainy texture and a patch of black appears at the base. This item is finely flaked at the edges with large flake scars at the center of the body; it is quite thin in cross-section. This specimen is identical to several items collected by John Wesley Powell between 1867 and 1880 from the southern Paiute in southern Utah (Fowler and Matley 1979:68, Figure 57). Powell's specimens are knives hafted in willow or cottonwood handles.

The other complete specimen is a large basalt item, fairly thin in cross-section, with nearly parallel sides and rounded ends (26EU788-1-3). It measures 111.3 mm in length, 52.6 mm in

width, 13.2 mm in thickness and weighs 81.4 grams. It is broken in two pieces, both of which are battered from modern impacts; in addition, the edges are crushed, apparently from prehistoric utilization. The item is secondarily thinned and no cortex is present.

Of the two fragmentary specimens collected, one (26EU810-1-5) is a terminal and partial medial fragment of thermally altered white chert. Flake scars are broad and irregular, ending in hinge fractures; the surface is crazed. 26EU8110-1-7 is a lateral edge fragment, secondarily thinned, which appears to be a thin cross-section of a larger item. It is made of grey chert with large flake scars on the body and finer flaking at the edges.

Drill. One drill (26EU810-1-6) was recovered (Figure 12a). It is of thermally altered white chert with broad flake scars, some ending in hinge fractures. The shaft is diamond shaped in cross-section and the tip is missing. The base, which is secondarily thinned, is lenticular in cross-section, and the proximal end is truncated.

Flake Tool. This specimen (26EU772-1-3) is a modified basalt flake with the platform and part of the right lateral edge missing. The left and right lateral edges are utilized, and the other edges are battered. The basalt is fine grained, and cortex is present on the dorsal surface.

Debitage. Debitage was recovered from five sites for a total of 35 pieces. Eleven flakes were collected from 26Eu772; ten white to translucent chert/chalcedony (26EU771-1-1), of which one is shattered and has cortex on one edge; nine are small, secondary biface reduction flakes. The other flake from this site (26EU771-1-2) is a medium-sized biface reduction flake of jasper mottled with pink. The flake is somewhat battered on the proximal end.

Four flakes were recovered from site 26EU775. One (26EU775-1-2) is translucent chalcedony mottled with a rust-red color. It is a biface reduction flake broken at the proximal end. Three flakes (26EU775-1-1) are thermally altered opaque gray chert. These are biface reduction flakes with traces of cortex on two.

One large gray chert flake was recovered from 26EU783 (26EU783-1-1). Site 26EU797 had a total of seven flakes collected from the surface. Five are biface reduction flakes (26EU797-1-1) made of thermally altered white chert, and two (26EU797-1-2) are grainy white chert with inclusions.

Twelve flakes were recovered from site 26EU810. Eight (26EU810-1-1) are biface reduction flakes of grainy white chert with inclusions. Two (26EU810-1-2) are mottled gray beige chert biface reduction flakes. One (26EU810-1-3) is a broken white chert flake with cortex inclusions along one edge. One (26EU810-1-4) is a thermally altered white chert biface reduction flake.

Pottery. One grayish-brown rim sherd (26Eu834-1-1) was collected (Figure 12e). This fragment is 64mm long by 54.7 mm wide; average thickness is 7 mm, and it weighs 25.3 grams. The paste is relatively coarse and has large inclusions or grains of temper. Comparison with published descriptions (Coale 1963; Fowler 1968a; Rudy 1953; Tuohy 1956) indicate it is Shoshoni ware. The sherd shows numerous striations on both the interior and exterior surfaces. It is decorated with vertical fingernail impressions spaced just below the rim on the exterior surface. The vessel was probably a large, conical cooking pot. The time span of Shoshoni Brown ware in the eastern Great Basin falls between A.D. 1200-1300 and 1850.

Historic Artifacts

Only one historic artifact was collected during the survey. It is a square, brown glass bottle, blown in a two piece mold,

with an applied lip (Figure 14). It is embossed with the words, "Dr. J. Hostetter's Stomach Bitters."

Bitters was a popular stomach remedy from 1860-1900 (Lorrain 1968:44). Concerning the efficacy of the product, we have this testimony found in "Hostetter's California Almanac, words addressed to Merchants, Mechanics, Farmers, and Miners, and all Families. 1861" (Tibbitts 1964:6):

> Hostetter's Stomach Bitters. Furnished with this preventive, the pioneer of California may fearlessly prosecute his search for gold and silver, in valleys and plains where his less fortunate predecessors have left their bones. The discolored water which serves alike to quench his thirst and obtain his treasure, may be drunk with impunity if mixed with this powerful and agreeable corrective, and the miasma which reeks from the soil of the mining regions, will have no injurious effect upon his system if sustained and fortified by this pure and wholesome invigorant and stomachic. He may sleep wrapped in his blanket or buffalo robe, on the damp ground, by night, and brave the hot beams of the sun by day, without incurring the usual penalties of Remittent Fevers, Diarrhoea, Dysentary, and Bilious Cholic, provided he reinforces his constitution, his appetite, and his strength by moderate and regular use of the Hostetter's Bitters.

The bottle was associated with 26Eu811, an historic charcoal production site dating to ca 1870-1890.

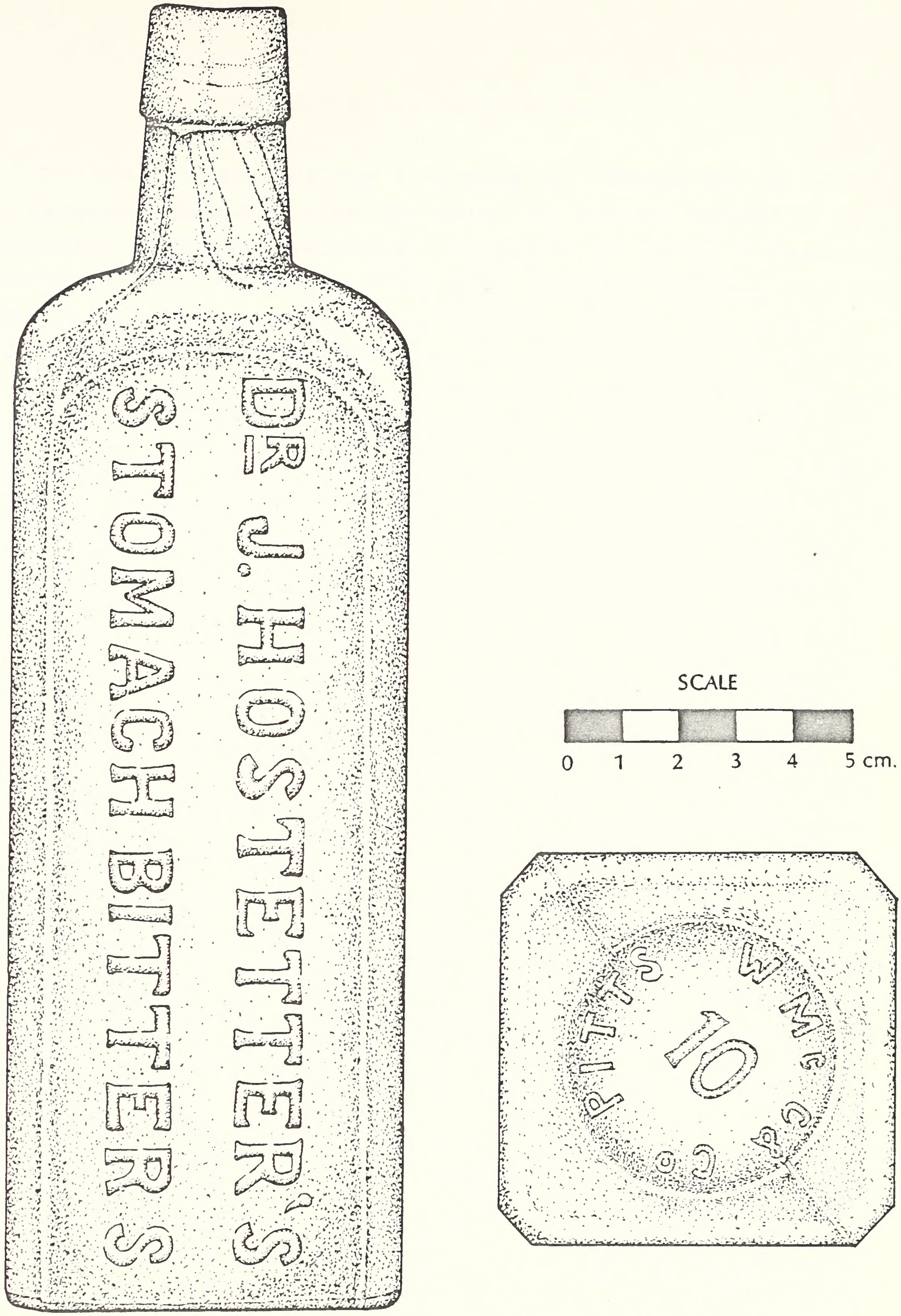

DR J. HOSTETTER'S
STOMACH BITTERS
SCALE
0
1
2
3
4
5 cm.
W M C & CO
PITTS
10

Figure 14. Hostetter's bitters bottle, 26EU811-1.

ANALYSIS AND CONCLUSIONS

The primary goal of the archeological survey was to sample the proposed project area in order to obtain baseline data concerning cultural resources. In terms of cultural resource management, we wanted to know what kinds of prehistoric and historic sites occur in the project area, how they are distributed in the landscape, and whether any qualify for the National Register of Historic Places. In order to discuss cultural resources in terms of kinds of sites and their eligibility to the National Register, we developed a research design in which we outlined two major research problem areas: cultural chronology, and settlement and subsistence patterns. Information concerning both research problem areas, as well as site distribution, was obtained during the survey.

Site Distribution and Site Type

As previously described, the Mt. Hope project area was divided into a number of subareas. The Mine Area, including Mt. Hope itself and much of the Tyrone Creek and Garden Creek drainages, is where the actual mining and milling will take place. Sites B, J, and I are proposed alternate tailings pond locations. The size of each of the sample areas in acres is given in Table 13. It should be noted that the areas we examined are polygons which were imposed on areas of more irregular shape for the purposes of sampling. In Table 13 the areas are also given as percentages of the total 17,000 acres we sampled.

All other things being equal, site distribution should be proportional to area. However, as shown in Table 14, this is not the case. The Mine Area has more sites than it should, and Sites J and I have fewer. The abundance of sites is also high in Site B; especially so since so much of Site B has been previously disturbed by crested wheat planting.

Table 13. Size of Study Areas

	Mine Area	Site B	Site J	Site I	TOTAL
No. of Acres	10,560	1920	1960	2560	17,000
Percentage	62.12	11.29	11.53	15.06	

Table 14. Total Site Frequency in 10% Sample Areas

	Mine Area	Site B	Site J	Site I	TOTAL
No. of Sites	40	7	4	1	52
Percentage	76.92	13.46	7.69	1.92	

When only prehistoric sites are considered, however, the site distribution is somewhat different. The abundance of sites in the Mine Area is more nearly that which would be expected if abundance is proportional to area. However, site abundance in Site B is much higher than expected, especially considering the disturbance from crested wheat seeding. The abundance of prehistoric sites in Sites J and I remains lower than expected.

The number of prehistoric sites was also divided by the actual number of acres examined in each of the study areas to give the sites per acre estimate in Table 15. This in turn was multiplied by the total number of acres in each area to yield the projected total numbers of prehistoric sites in each area.

Table 15. Frequency and Density of Prehistoric Sites in 10% Sample Areas

	Mine Area	Site B	Site J	Site I	TOTAL
No. of Sites	22*	7	2	1	32
Percentage	68.75	21.88	6.25	3.13	
Estimated Site/Acres	.0208	.0365	.0102	.0039	
Projected Total No. of Sites	219.7	70.1	20.0	10.0	319.8

* includes three sites which also have historic components.

This may seem like a large number of sites, but consider the relative percentages of prehistoric sites given in Table 16. Most (62.5%) are classified as task sites, and many of those are very small. For instance, in the Mine Area, 16 of the 22 prehistoric sites (72.7%) are task sites, and 12 (75%) of those are isolates or small scatters of less than 25 items. Nevertheless, by extrapolation, the expected number of field camps and lithic workshops in the Mine Area is about 30 of each type, and based on our experience in the region, this seems too high by a factor of two.

Prehistoric sites are not evenly distributed throughout the Mine Area. The portions of the Mine Area in sagebrush-grass vegetation have a very low site density. Most prehistoric sites in the sagebrush-grass are found on ridges overlooking lower Garden Pass Creek below Tyrone Creek. The highest prehistoric site density is found in pinyon-juniper woodland on the main ridge extending south from Mt. Hope which separates the Garden

Table 16. Prehistoric Site Types by Area

	Mine Area		Site B		Site J		Site I		TOTAL	
	N	%	N	%	N	%	N	%	N	%
Field Camp	3	13.6	0	--	0	--	0	--	3	9.4
Lithic Workshop	3	13.6	5	71.4	0	--	0	--	8	25.0
Quarry	0	--	1	14.3	0	--	0	--	1	3.1
Task Site	16	72.7	1	14.3	2	100.0	1	100.0	20	62.5
	22		7		2		1		32	

Pass drainage from Kobeh Valley, and in a small basin just west of that ridge. The area of high site density is also just north of the saddle at the head of Tyrone Creek through which the Pony Express and Overland Stage route passed. It is likely that this trail has always been important, and the prehistoric sites may be, in part, related to travel along it. The saddle appears to be a good place to intercept game animals traveling across the ridge, while the head of Tyrone Creek and the basin on the west side may have been places where game animals congregated, especially in the winter. Other areas in the pinyon-juniper woodland were not used so intensively.

The prehistoric site density estimated for Site B is the highest of the four areas we sampled, even though at least 70% of Site B has been disturbed by crested wheat seeding. Had it not

been previously disturbed, the site density would doubtless have been even higher. Since the seeding destroyed an unknown number of sites, the projected total number of sites for the area is not to be trusted. Our feeling is that the projected number is too large and that the number of prehistoric sites remaining there is much smaller. The seeding also prevents an accurate estimate of prehistoric site type in Site B. All but one of the remaining sites were classified as lithic workshops or quarries. This suggests that a more limited range of prehistoric activities was carried out in Site B than in the Mine Area, but it is possible that all representatives of one or more site types may have been plowed under.

Three prehistoric task sites were found in the Site B "arm", all small lithic scatters.

The relatively low number of prehistoric sites in Site J was surprising to us since it is in pinyon-juniper woodland similar in some ways to parts of the Mine Area. However, it is not located on a major game trail or in an area in which game might have congregated.

Only one prehistoric site was found in Site I, located on the floor of Diamond Valley. The site was an isolated biface fragment. Since Site I contains several relict shore features of ancient Lake Diamond, we anticipated finding pre-Archaic archaeological sites there, but none was observed.

Site density also seems to be relatively high in the proposed highway relocation corridor west of the gap in the Sulpher Spring Range. These sites are all located in pinyon-juniper woodland; two of the sites are field camps and one is an isolated projectile point. We surveyed a corridor 21,470' long and 50` wide, for a total of 24.6 acres. Prehistoric site density along the highway corridor is 0.12 site/acres.

Prehistoric Settlement and Subsistence

The settlement and subsistence model presented in our research design predicted that most prehistoric sites in the project area would be related to seasonal hunting and gathering, especially pinyon exploitation and big game hunting. We did not expect to find winter habitation sites, but rather field camps occupied as residential bases by task groups for relatively short periods of time, and task sites where resources were obtained and initially processed.

The range of site types in the project area is exactly as predicted: field camps and task sites. However, most of these appear to be related to big game hunting and processing and/or lithic procurement and manufacture. Very few sites contain any evidence of seed processsing and, except for a few problematical stone circles which might be pinyon caches, there is no evidence for intensive pinyon exploitation.

Prehistoric Cultural Chronology

The chronology of prehistoric occupation in the study area is given by time diagnostic projectile points and ceramics. As can be seen in Table 17, time marking artifacts were not observed on more than half of the prehistoric sites. For the remainder, chronology is indicated by one, or at most, only a few points. We consider the presence of one or more artifacts diagnostic of a particular time period to be evidence of a cultural component of that age at that site. A site can have more than one component. A site with no time marking artifacts has only a single component of unknown age. Evidence of occupation during a particular period does not mean that the site was not also occupied earlier and/or later, but we cannot know that is the case.

Most of the chronologically known components in the study area are attributed to the Archaic. In the chronology developed

by Thomas (1982) for the central Great Basin, the Archaic is divided into phases. The Reveille phase is from 1500 BC to AD 500, and is marked by Elko Series points. Nine components in the project area (8 in the Mine Area, 1 in the Highway Route), are evidenced by Elko points. Three other components (2 in the Mine Area, 1 in Site B) are marked by Rosegate points, diagnostic of the Underdown phase between AD 500 and Ad 1300. Three additional components (all in Site B) are considered to be Archaic, but contain Large Side-Notched and Humboldt points, considered by Thomas (1982) to be relatively poor time markers. Three components, marked by Desert Side-Notched points and Shoshone pottery, are diagnostic of the Numic and the Yankee Blade phase between AD 1300 and historic times.

These data suggest that the most intensive period of exploitation was during the mid-Archaic, equivalent to the Reveille phase in age. Thomas (1982) has remarked that this period seems to be a time of population growth and expansion into upland situations during an interval of cooler and moister conditions (the Neoglacial). However, as we have seen, it appears likely that occupation in the project area at that time was mainly involved with hunting big game and obtaining lithic resources, rather than with seed gathering and processing.

Table 17. Distribution of Prehistoric Sites by Cultural Period

Pre-historic Period	Number of Components Mine Area	Site B	Site J	Site I	High-way	South of Mine Area	Total N	%
Pre- Arch	0	0	0	0	0	0	0	0
Archaic	10	3	0	0	1	0	14	35.0
Numic	2	0	0	0	1	0	3	7.5
Unknown	11	4	2	1	0	3	23	57.5
	22	7	2	1	2	3	40	

Paleoenvironmental Change

Aside from the relict shore features of ancient Lake Diamond and the stream terrace system graded to the Lake Diamond highstand, we have observed no direct evidence for paleoenvironmental change in the project area. However, erosion is not pronounced, even along the major drainages, so that the Holocene record has not been exposed. We did note the location of woodrat middens during the survey, but none of these was large enough to be very old.

Historic Chronology

Based on our review of historic data, we determined that historic period sites would fall into one of three broad temporal categories. The pre-1869 category should include small sites related to the early east-west transportation corridor which passed through the area; few of these sites were anticipated. Support activities associated with intensive mining at Eureka should dominate the 1869 to 1886 period in the Mt. Hope area. These include a shift to north-south transportation (both rail and wagon routes) and the extensive exploitation of the area's pinyon. It is possible that mining was also taking place on Mt. Hope ca. 1870. The year 1886 is employed as the cutoff for the most recent period since this is when intensive mining began at Mt. Hope. Post-1886 historic sites will be associated with these mining operations and dispersed ranching activities. The distribution of sites recorded in the sample transects by temporal period is provided in Table 18.

Examination of Table 18 reveals that a single site was recorded which appears to have been associated with pre-1869 activities in the area. Site 26EU798 is an isolated bottle base located adjacent to the old east-west stage and freight route, the same route used by the Pony Express.

Table 18. Distribution of Historic Sites by Time Period

	Number of Sites					
Historic Period	Mine Area	Site B	Site J	Site I	Highway Relocation	
Pre-1869	1					1
1869-1886	17	1	1			19
Post-1886	1	1	2		1	5
Uncertain	3	1				4
	22	3	3	0	1	29

Table 18 clearly shows that a majority of the historic sites recorded date to the peak period of mining at Eureka. Closer review of these sites shows that one is associated with a wagon road (26EU794), while three were related to the construction and operation of the Eureka and Palisades Railroad (Sites 26EU787, 790, and 791). One of these sites, 26EU787, is the possible location of the old Mt. Hope Station. The remaining 14 sites that date to the period, of which 5 are quite substantial (26EU796, 800, 809, 810), contain evidence of wood cutting and the production of charcoal. None of the sites reflects actual mining activities. If traces of pre-1886 mining exist, then we simply did not trip over them or they have been obliterated by subsequent mining activities.

Post-1886 use of the general area appears to have been quite restricted. It should be noted, however, that the area of the contemporary Mt. Hope Mine was not examined. It appears that post-1886 mining activities in the area were restricted in their lateral distribution; not much took place outside the immediate area of the Mt. Hope Mine. This conclusion is reinforced by the fact that two of the post-1886 period sites (26EU792 and 804) appear to be habitation sites while another is a probable horse trap (26EU784). Possible mineral exploration of the area is

evidenced at only one site (26EU836) which is located along the proposed highway relocation route. Present is an exposed face of country rock with numerous holes drilled into it.

Historic Site Distribution and Type

The distribution of historic sites in the project area is much more restricted than that of prehistoric sites. Table 19 shows the frequency of historic sites in the sample areas.

Thus, within our 10% sample, there are no historic sites in either Site B or Site I. Over 90% of all historic sites in the project area occur in the Mine Area. This is not surprising since the Mine Area contains all of the historic mining activity, the railroad and other transportation corridors, as well as substantial portions of the pinyon-juniper woodland exploited by charcoal makers.

Table 19. Frequency and Density of Historic Sites in 10% Sample Areas.

	Mine Area	Site B	Site J	Site I	TOTAL
No. of Sites	21*	0	2	0	23
Percentage	91.30	0	8.70	0	
Site/Acres	.0199	0	.0102	0	
Projected Total No. of Sites	210.14	0	20.00	0	

* includes 3 sites with prehistoric components

Historic period sites recorded during the project fit into five major functional categories:

1. transportation corridors (roads, Pony Express route, railroad);
2. mining activities;
3. charcoal production;
4. possible habitation; and,
5. miscellaneous (corrals, isolated debris, etc.).

Certain of these functional classes of sites exhibit a distinct distributional pattern. Obviously, sites associated with transportation systems (wagon roads and railroads) are concentrated along that transportation corridor. A majority of such sites could probably be identified by inspecting a linear path centered on the corridor.

Given the results of our sample reconnaissance of the project area, it appears that mining related sites will be restricted almost entirely to the area of the historic Mt. Hope Mine. Surprisingly little was found in the surrounding area that would seem to reflect any extensive mineral exploration.

With regard to the charcoal production sites, examination of aerial photographs reveals that they exhibit an identifiable signature. They appear as small gray dots or smudges approximately 2 mm in diameter which stand out quite well in certain areas. They are all located in flat, sage covered areas adjacent to stands of pinyon. Not only were we able to locate several of the charcoal lenses recorded during the 10% transect samples on the aerial photographs, but we were also able to identify perhaps as many as ten more such features. All are in the bottom of a small drainage cut along the south face of Mt. Hope, and on the pinyon covered ridge between Mt. Hope and Whistler Mountain. Of interest is that the majority seem to lie within a fairly narrow elevational band, ranging from about 6600

to 6800 feet. Many are concentrated in small canyons on either side of a dirt road which runs north and ties into the Eureka and Palisades Railroad near the presumed location of the Mt. Hope Station. This suggests to us that the roadway probably dates to the 1800's and, further, it leads us to suspect that the charcoal may have been transported via rail to Eureka.

As discussed earlier in this report, the need for firewood and charcoal resulted in the deforestation of an ever increasing area around Eureka. Young and Budy (1979:117) indicate that by 1874 the area 20 miles around Eureka had been denuded and by 1878 the average haul rate was 35 miles. The distance from Eureka to Mt. Hope falls between these figures and, for the sake of discussion, we assume that a majority of charcoal production in the project area took place between about 1875 and 1880.

Ethnicity of Historic Groups

An important historic research topic identified by Hardesty (1982:214) for central Nevada is that of ethnicity: can distinct ethnic groups be recognized in the archaeological remains of historic sites. Sites in the Mt. Hope area are of relevance with regard to this topic. First, the historic literature suggests that charcoal production in the Eureka area was largely associated with a single ethnic group, the Italians. If so, careful examination of charcoal production sites may provide valuable information regarding ethnic identity in the archaeological record. Second, Site 26EU790 contains fragments of Chinese ceramics which suggests to us that Chinese may well have occupied the site. The site is located along the Eureka and Palisades Railroad and appears to be associated with it. While we found no mention of Chinese railroad construction workers in the historic record, it is possible that Chinese participated in construction of the E & P Railroad. If so, the historic component of Site 26EU790 may date to ca. 1875 when construction took place.

The Technology of Charcoal Production

A second research topic of relevance, given the nature of the historic data at Mt. Hope, is the actual process of charcoal production. The general technique of earthen pit charcoal production has been discussed elsewhere (Murbarger 1965; Young and Budy 1979; and Wigginton 1979) but its archaeological reflection has received less attention. Elston, Hardesty and Zeier (1982:270) suggest that the "catchment basin" for a charcoal pit oven would range from approximately 8 to 100 acres in central Nevada pinyon-juniper woodland areas. In addition, they state that earthen pit ovens have an associated residence where the collier can stay while tending the oven (Elston, Hardesty and Zeier 1982:24). Do the sites in the Mt. Hope area reflect this scale of catchment? Is there evidence of a residential structure or a tent platform? Is the archaeological manifestation of charcoal production similar to that recorded in eastern California by Elston, Hardesty, and Zeier (1982)? These are questions that could be addressed by additional research of Mt. Hope charcoal production.

Predictions of Historic Site Location

Based on the data generated during the sample survey, it is possible to make certain predictions as to what the archaeological record for the entire project area is like. Undoubtedly, most historic period resources will be located in the Mine Area. These will cluster in three areas, along transportation corridors (the railroad and the dirt road running south from it), the southern face of Mt. Hope and at the head of Tyrone Creek, and at the Mt. Hope Mine proper. Survey results suggest that historic sites will be concentrated along the northern margin of project Site Areas B and J. Site density drops off when out of the pinyon and onto the flatter, sage covered pediment. Historic resources located in Site B should be few in number and date mostly to the post-1886 period. The Pony

Express route cuts diagonally through Site B but site density along the route should be very low. Resources in Site J will reflect mostly charcoal production activities. Few, if any, historic sites are anticipated in project Site I.

MANAGEMENT RECOMMENDATIONS

Based on results of the Class II sample survey, several recommendations with regard to management of prehistoric and historic resources in the project area are indicated.

Prehistoric Site Management Recommendations

It appears likely that the project area served as hinterland throughout prehistoric time. It was used as a seasonal resource area, but was not inhabited on a long term basis, with the possible exceptions of the sites at McBride's Spring (26EU837) and the Mine Site (26EU788). It is unlikely, therefore, that more than a few of the prehistoric sites will qualify for eligibility to the National Register of Historic Places. Those demonstrating potential for eligibility, on an individual basis, are the field camps where there are features and a variety of artifacts present, along with some possibility of a depositional record. These will require additional evaluation with regard to the kinds and amounts of data they contain. The majority of prehistoric sites seem to be relatively sparse surface artifact scatters. While most of these sites do not exhibit potential for eligiblity to the National Register individually, in the aggregate they preserve a record of prehistoric land use and chronology which has scientific and cultural interest.

The recovery and preservation of that record will not require the location of every site and the collection of every artifact. We feel that data from the present study do not support a necessity for an intensive Class III survey of the entire project area. Prehistoric site distribution is restricted, and we recommend that efforts be concentrated on the location of sites which contain the most information. With six exceptions (all small task sites), prehistoric sites are located on ridges or terraces above and within 150 meters of ephemeral drainages. The obvious sampling strategy would be to draw a

sample of drainages and survey at Class III intensity along and within 150 m of them.

Special attention should be given to areas in which the prehistoric record seems particularly rich, such as the relatively small area on both sides of the ridge extending southward from Mt. Hope, and the area in the highway reroute between McBride's Spring and the gap in the Sulpher Spring Range. Impacts to these areas should be avoided, if possible. If not, data recovery should be possble through intensive Class III survey, collection, testing, and excavation (or some combination thereof). Data recovery from a limited sample of small sites could be achieved through systematic surface collection.

No additional work is recommended in the crested wheat seeding in Site B because the archaeological record has already been destroyed.

Although only a single isolated find was discovered in Site I, additional survey of the relict shore features should be conducted; pre-Archaic sites could exist there, although none was encountered during the sample survey.

Historic Site Management Recommendations

Most of the historic sites also exhibit a high degree of locational patterning. This makes it possible to exclude major portions of the project area from any future survey efforts due to their relatively low historic site density. Areas of projected high density should, however, be investigated at the level of a Class III intensive survey. These areas include:

1. a 100 m corridor centered on each of the historic roads that pass through the area;
2. a 100 m corridor centered on the suspected route of the Pony Express;

3. a 200 m corridor centered on the Eureka and Palisades Railroad route; and,
4. the area of the Mt. Hope Mine.

In addition, a more thorough examination of aerial photographs should be conducted in order to identify probable charcoal production areas within the project area. Those identified should be field checked. Once comparable data is available for all such sites in the area, decisions can be made as to which are the most significant and warrant special consideration.

Several of the historic sites recorded during this survey may be eligible to the National Register of Historic Places. A final determination, however, is not entirely possible without further testing of the sites. Such testing would focus on the quantity and quality of the data present at each site and its applicability to current research questions. Sites that deserve such attention include 26EU787, 790, 796, 800, 809, and 810.

NATIVE AMERICAN CONSULTATION

Various federal laws and associated regulations address the issue of Native American Consultation during the preparation of major environmental statements. The most significant of these is the National Environmental Protection Act (NEPA), and related regulations issued by the Council on Environmental Quality, which states that federally recognized Indian tribes should be participants in the NEPA process.

The American Indian Religious Freedom Act provides for the preservation and protection of sacred places, animals, plants, and artifacts. It also ensures freedom of access to these by Native Americans. The Historic Preservation Act calls upon government agencies to pursue actively the preservation of significant historic sites, archaeological sites, and culturally important locations. The Advisory Council on Historic Preservation encourages the participation of relevant, federally recognized tribes during the evaluation of cultural resource significance and the development of impact management alternatives.

No reservation lands are near the project area; however, the region in which Mt. Hope is located was once occupied by the Western Shoshone. In order to ensure an opportunity for the early identification of potential Native American concerns with regard to the Mt. Hope project, Intermountain Research initiated contact with various Indian groups in Nevada in February and March 1983. Letters introducing the proposed Mt. Hope Project were sent to the Inter-Tribal Council of Nevada, the Paiute-Shoshone Tribe of Fallon, the Duckwater Shoshone Tribe, the Yomba Shoshone Tribe, and the Battle Mountain Colony (Te-Moak Bands of Western Shoshone). Comments and suggestions with regard to contemporary Indian land use and concerns were solicited.

One response was received; the Duckwater Shoshone Tribe

wrote to present the information that the Western Shoshone and the United States are presently in litigation with regard to the disposition of the land in the project area (as well as other lands). Copies of correspondence relating to Native American consultations appear in Appendix II.

REFERENCES CITED

Angel, Myron (editor)
1881 History of Nevada with illustrations and biographical sketches of its prominent men and pioneers. Thompson and West, Oakland, California. Reprinted 1958, with an introduction by David F. Myrick, Howell-North Books, Berkeley.

Bancroft, Hubert Howe
1890 History of Nevada, 1540-1888. The History Company, San Francisco. Reprinted 1981, with an introduction by Jerome E. Edwards, Nevada Publications, Las Vegas.

Barrett, Reginald H.
1965 A history of bighorn in California and Nevada. Transactions Desert Bighorn Council 1965, pp. 40-48.

Barrett, Samuel A.
1917 The Washo Indians. Bulletin of the Public Museum of the City of Milwaukee 2(1).

Bartlett, Richard A.
1962 Great surveys of the American West. University of Oklahoma Press, Norman.

Beaudry, Marilyn
1979 A cost-benefit analysis of several methods of collecting and analyzing lithic material. Journal of New World Archaeology 3(3):29-40.

Beck, C. M.
1981 Shoshone brownware from Grass Valley, Nevada. Annals of Carnegie Museum 50:1-29.

Beckwith, Lieutenant E. G.
1855 Report of exploration for a route for the Pacific railroad on the line of the forty-first parallel of north latitude. In Explorations and surveys for a railroad route from the Mississippi River to the Pacific Ocean. Vol. II, pp. 1-132. War Department, Washington.

Bettinger, Robert L., and Martin A. Baumhoff
1982 The Numic spread: Great Basin cultures in competition. American Antiquity 47:485-503.

Billings, W. D.
1951 Vegetational zonation in the Great Basin of western North America. Union Internationale des Sciences Biologiques, Serie B (Colloques), 9:101-122.

Binford, Lewis R.
1980 Willow smoke and dogs' tails: hunter-gatherer settlement systems and archaeological site formation. *American Antiquity* 45:4-20.

Bouey, Paul
1979 The validity of surface lithic assemblages: a test in Grass Valley, Nevada. *Journal of New World Archaeology* 3(3):16-28.

Brecheisen, Neal
1980 Eureka County gravel pits. BLM CR Report 6-263. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

Brook, Richard A.
1980 Inferences regarding aboriginal hunting behavior in the Saline Valley, Inyo County, California. *Journal of California and Great Basin Anthropology* 2:60-79.

Brooks, George R. (editor)
1977 *The southwest expedition of Jedediah S. Smith*. The Arthur H. Clark Company, Glendale, California.

Bureau of Land Management
1982 *Cultural resources survey: general guidelines* (second ed.). Bureau of Land Management, Reno, Nevada.

Burton, Richard F.
1963 *The city of the saints and across the Rocky Mountains to California*, edited by Fawn M. Brodie. Alfred A. Knopf, New York.

Busby, Colin I.
1974 Pinyon nut gathering equipment from the vicinity of Gardnerville, Douglas County, Nevada. *Contributions of the University of California Archaeological Research Facility* 21:51-63. Berkeley.

Busby, Colin I., and Larry S. Kobori
1980 A cultural resource inverntory of the MX Missile System in Nevada: Phase I, 1980. Report prepared for Henningson, Durham and Richardson, Sciences Division, Santa Barbara, California, by Commonwealth Associates, Jackson, Michigan, and Basin Research Associates, Berkeley, California.

Carlson, Helen S.
1974 *Nevada place names: a geographical dictionary*. University of Nevada Press, Reno.

Casjens, Laurel
1974 *The prehistoric human ecology of southern Ruby Valley, Nevada*. Unpublished Ph.D. dissertation, Harvard University.

Clewlow, C. William, Jr., and Mary Rusco
1972 The Grass Valley archeological project: collected papers. _Nevada Archeological Survey Research Paper_ 3.

Clewlow, C. William, Jr., and Allen G. Pastron
1972 The Grass Valley archeological project: preliminary investigations. In The Grass Valley Archeological Project: collected papers, edited by C. William Clewlow, Jr., and Mary Rusco. _Nevada Archeological Survey Research Paper_ 3:11-32.

Clewlow, C. William, Jr., Helen F. Wells, and Richard D. Ambro
1978 History and prehistory at Grass Valley, Nevada. _University of California, Los Angeles, Institute of Archaeology Monograph_ 7.

Cline, Gloria Griffen
1963 _Exploring the Great Basin_. University of Oklahoma Press, Norman.

Coale, George L.
1963 A study of Shoshonean pottery. _Tebiwa_ 6(2):1-11.

Couch, Bertrand F., and Jay A. Carpenter
1943 Nevada's metal and mineral production (1859-1940, inclusive). _Geology and Mining Series 37, University of Nevada Bulletin_ 37(4).

Crabtree, R. H.
1979 Antelope Valley and Roberts Mountain soils contract. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

1981 Garden Pass-Alpha fence. BLM CR Report 6-406(P). Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

1982 Roberts Mountain exclosure. BLM CR Report 6-533. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

Crittenden, Laurel and Robert G. Elston
1981 A class II cultural resource reconnaissance of the Saval Ranch Research and Evaluation Area, Elko County, Nevada. Report submitted to the Bureau of Land Management, Elko District, Nevada.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, and J. L. Reveal
1972 Intermountain flora. _Vascular plants of the Intermountain West_, Vol. 1. Hafner, New York.

Currey, Donald R., and Steven R. James
1982 Paleoenvironments of the northeastern Great Basin and northeastern Basin rim region: a review of geological and biological evidence. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. *Society for American Archaeology Papers* 2:27-52.

Curtis, Joseph S.
1884 Silver-lead deposits of Eureka, Nevada. *U. S. Geological Survey Monograph* 7.

Davis, Jonathan O.
1982 Bits and pieces: the last 35,000 years in the Lahontan area. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. *Society for American Archaeology Papers* 2:53-75.

Dutcher, B. H.
1893 Piñon gathering among the Panamint Indians. *American Anthropologist* (o.s.) 6:377-380.

Earl, Phillip
1969 Nevada's Italian war, 1879 (Sometimes known as the "Charcoal War" or the "Coal Burner's War"). *Nevada Historical Society Quarterly* 12(2):47-87.

Egan, Howard R.
1917 *Pioneering the West, 1846 to 1878*, edited by William M. Egan. Howard R. Egan Estate, Richmond, Utah.

Elston, Robert G.
1980a A program of cultural resource preservation, protection and research on the Gund Ranch, Grass Valley, Nevada. Phase I: overview and inventory. Report submitted to the Division of Historic Preservation and Archaeology, Nevada State Department of Conservation and Natural Resources, Carson City, Nevada, by Agricultural Experiment Station, Fleischmann College of Agriculture, University of Nevada, Reno.

1980b Cultural resources in Grass Valley. In Physical, biological, and cultural resources of the Gund Research and Demonstration Ranch, Nevada, edited by James A. Young and Raymond A. Evans, pp. 64-68. *USDA, Science and Education Administration, Agricultural Reviews and Manuals, Western Series* 11. Oakland, California.

1982 Good times, hard times: prehistoric culture change in the western Great Basin. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. _Society for American Archaeology Papers_ 2:186-206.

Elston, Robert G., and Jonathan O. Davis
1979 An overview of cultural resources in the Lahonton Cutthroat Trout study area, Black Rock Range, Humboldt County, Nevada. Report submitted to the Winnemucca District Bureau of Land Management. Ms. on file, BLM Office and Special Collections, University of Nevada Library, Reno.

Elston, Robert, Donald Hardesty, and Charles Zeier
1982 An analysis of archaeological and historical data recovered from selected sites. Report submitted to the U.S. Forest Service, Tahoe National Forest, Nevada City, California by Intermountain Research, Silver City, NV,

Emmons, W. H.
1910 A reconnaissance of some mining camps in Elko, Lander, and Eureka Counties. _U.S. Geological Survey Bulletin_ 408.

Ertec Northwest, Inc.
1981 Cultural resources assessment for geotechnical site verification at 157 sites in Kobeh, Monitor, Ralston, and Big Smoky Valleys, Lander, Nye, and Eureka Counties, Nevada. ERTEC Northwest, Inc., Seattle, Washington.

Fenenga, Franklin
1975 A Washo pine nut camp in Douglas County, Nevada. _Journal of California Anthropology_ 2:205-213.

Fenneman, N. H.
1931 _Physiography of western United States_. McGraw-Hill, New York.

Fowler, Catherine S., and Don D. Fowler
1971 Notes on the history of the Southern Paiutes and Western Shoshonis. _Utah Historical Quarterly_ 39:95-113.

Fowler, Donald D.
1968a Archaeological survey in eastern Nevada, 1966. _Desert Research Institute Publications in the Social Sciences_ 2.

1968b The archaeology of Newark Cave, White Pine County, Nevada. _Desert Research Institute Publications in the Social Sciences_ 3.

Fowler, Donald D. and John F. Matley
1979 Material culture of the Numa: The John Wesley Powell Collection 1867-1880. *Smithsonian Contributions to Anthropology* 26.

Frickstad, Walter N., and Edward W. Thrall
1958 *A century of Nevada post offices, 1852-1957*. Pacific Rotaprinting, Oakland.

Fugro Northwest, Inc.
1980 Environmental assessment for geotechnical site verification studies, Moniter and Kobeh Valleys in Nye, Lander, Eureka Counties, Nevada. Fugro NW, Inc., Seattle, Washington.

Grayson, Donald K.
1982 Toward a history of Great Basin mammals during the past 15,000 years. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. *Society for American Archaeology Papers* 2:82-101.

Hague, Arnold
1892 Geology of the Eureka District, Nevada. *U. S. Geological Survey Monograph* 20.

Hall, E. Raymond
1946 *Mammals of Nevada*. University of California Press, Berkeley and Los Angeles.

1961 *Bison bison* in Nevada. *Journal of Mammalogy* 42:279-280.

Hanes, Richard, and Sam Ball
1982 The central Nevada study unit. In *An archaeological element for the Nevada Historic Preservation Plan*, edited by Margaret M. Lyneis, pp. 93-122. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Hardesty, Donald L.
1982 The historic study unit: Farming/ranching activities. In *An archaeological element for the Nevada Historic Preservation Plan*, edited by Margaret M. Lyneis, pp. 208-223. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Hardesty, Donald L., and Eugene M. Hattori
1982 Archaeological studies in the Cortez Mining District, 1981. *Bureau of Land Management Nevada, Contributions to the Study of Cultural Resources, Technical Report* 8. Reno, Nevada.

Harris, Jack S.
1940 The White Knife Shoshoni of Nevada. In *Acculturation in seven American Indian tribes*, edited by Ralph Linton, pp. 39-116. Appleton, New York. Reprinted 1963, Peter Smith, Gloucester, Mass.

Heizer, Robert F., and Martin A. Baumhoff
1962 *Prehistoric rock art of Nevada and eastern California*. University of California Press, Berkeley and Los Angeles.

Heizer, Robert, Martin A. Baumhoff, and C. W. Clewlow
1968 Archaeology of South Fork Shelter (NV-EL-11), Elko County, Nevada. *Reports of the University of California Archaeological Survey* 71:1-58.

Heizer, Robert F., and Thomas R. Hester
1978 Great Basin. In *Chronologies in New World archaeology*, edited by R. E. Taylor and Clement W. Meighan, pp. 147-199. Academic Press, New York.

Hoffman, W. J.
1878 Miscellaneous ethnographic observations on Indians inhabiting Nevada, California, and Arizona. *Tenth Annual Report of the United States Geological and Geographical Survey of the Territories--Being a Report of the Progress of Exploration for the Year 1876*. Government Printing Office, Washington, D. C.

Holmer, Richard
1980 Regional research design. In Cultural resources existing data inventory, Salt Lake District, Utah, by Steven R. James and David J. Singer. Report prepared for BLM Salt Lake District, Salt Lake City, Utah, by Archeological Center, University of Utah, Salt Lake City.

Houghton, J. G., C. M. Sakamoto, and R. O. Gifford
1975 Nevada's weathers and climate. *Nevada Bureau of Mines and Geology Bulletin* 85:1-32.

Hubbs, Carl L., and Robert R. Miller
1948 The Great Basin, with emphasis on glacial and postglacial times: the zoological evidence. *Bulletin of the University of Utah* 38(20):17-166.

Hubbs, Carl L., Robert R. Miller, and Laura C. Hubbs
1974 Hydrographic history and relict fishes of the north-central Great Basin. *Memoirs of the California Academy of Sciences* 7.

James, Steven R.
n.d. Field notes and observations in eastern and northwestern Nevada, 1976-1981, in author's possession.

James, Steven R. (editor)
1981 Prehistory, ethnohistory, and history of eastern Nevada: a cultural resources summary of the Elko and Ely districts. *Bureau of Land Management Nevada, Cultural Resource Series* 3.

James, Steven R., Bonnie Brown, and Robert G. Elston
1982 Archaeological investigations at the Vista Site (26WA3017), Washoe County, Nevada. Report prepared by Intermountain Research, Silver City, Nevada, for Omni-Means, Reno, Nevada.

James, Steven R., and Charles D. Zeier
1981 An archaeological reconnaissance of eight candidate siting locations in White Pine County, Nevada. In The White Pine Power Project: cultural resource considerations, Vol 2. Report prepared by Intermountain Research, Silver City, Nevada, for Dames and Moore, Los Angeles.

James, Steven R. and Charles D. Zeier
1982 Eastern Nevada study unit. In *An archaeological element for the Nevada Historic Preservation Plan*, edited by Margaret M. Lyneis, pp. 123-159. University of Nevada, Las Vegas.

Janetski, Joel C.
1981 Ethnohistory/ethnography of the Elko and Ely districts. In Prehistory, ethnohistory, and history of eastern Nevada, edited by Steven R. James. *Bureau of Land Management Nevada, Cultural Resource Series* 3:149-210.

Judge, James W., James I. Ebert, and Robert K. Hitchcock
1975 Sampling in regional archaeological survey. In *Sampling in archaeology*, edited by James W. Mueller, pp. 82-123. University of Arizona Press, Tucson.

Kelly, Robert
1978 Paleo-Indian settlement patterns at Pleistocene Lake Tonopah, Nevada. Senior thesis, Department of Anthropology, Cornell University, Ithaca.

Kern, Edward M.
1876 Journal of Mr. Edward Kern of an exploration of Mary's or Humboldt River, Carson Lake and Owens River and Lake. Appendix Q in *Report of explorations across the Great Basin of the Territory of Utah for a direct wagon route from Camp Floyd to Genoa in Carson Valley in 1859* by Capt. J. H. Simpson. Government Printing Office, Washington.

Lamb, Sydney M.
1958 Linguistic prehistory in the Great Basin. *International Journal of American Linguistics* 24(2):95-100.

LaRivers, Ira
1962 Fishes and fisheries of Nevada. *Nevada state Fish and Game Commission Publication* 401.

Lincoln, Francis Church
1923 *Mining districts and mineral resources of Nevada*. Nevada Newsletter Publishing Co., Reno. Reprinted 1982, Nevada Publications, Las Vegas, Nevada.

Linsdale, Jean M.
1936 The birds of Nevada. *Cooper Ornithological Club Pacific Coast Avifauna* 23.

1940 Amphibians and reptiles in Nevada.

Lorrain, Dessamae
1968 An archaeologist's guide to nineteenth century American glass. *Historical Archaeology* 2:35-44.

McColm, Merlin A.
1963 A history of the bighorn sheep in central Nevada. *Transactions Desert Bighorn Council 1963*, pp. 1-11.

McGonagle, Roberta L.
1976 Mt. Hope Mine powerline N-12655 and pipeline N-12094. BLM CR Report 6-40(P). Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

McGuire, Kelly R.
1980 Cave sites, faunal analysis, and big-game hunters of the Great Basin: a caution. *Quaternary Research* 14:263-268.

McParland, Teresa E.
1981 Mount Hope Project P01-15 amendment. BLM CR Report 6-414. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

Madsen, David B.

1975 Dating Paiute-Shoshoni expansion in the Great Basin. *American Antiquity* 40:82-86.

1982 Get it where the gettin's good: a variable model of Great Basin subsistence and settlement based on data from the eastern Great Basin. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. *Society for American archaeology Papers* 2:207-226.

Madsen, Rex

1977 Prehistoric ceramics of the Fremont. *Museum of Northern Arizona Ceramic Series* 6.

Magee, Molly

1964 A flat-bottomed earthenware vessel from central Nevada. *American Antiquity* 30:96-98.

1966 The Grass Valley horse. *Plains Anthropologist* 11(33):204-207.

1967 A report on perforated sherds from central Nevada with a tentative suggestion for their use. *American Antiquity* 32:226-227.

Mason, Dorothy

1976 *The Pony Express in Nevada*. Compiled by Nevada Bureau of Land Management, published by Harrah's.

Matson, E. J.

1946 Exploration of the Mount Hope mine, Eureka County, Nevada. *U. S. Bureau of Mines Report of Investigations* 3928.

Mifflin, M. D., and M. M. Wheat

1979 Pluvial lakes and estimated pluvial climates of Nevada. *Nevada Bureau of Mines and Geology bulletin* 94.

Murabarger, Nell

1965 "Forgotten industry of the frontier," *Frontier Times* 39(3):26-27, 58-60.

Myrick, David F.

1962 *Railroads of Nevada and eastern California* (Vol. I). Howell-North Books, Berkeley.

Nissen, Karen M.

1974 The record of a hunting practice at petroglyph site NV-LY-1. *Contributions of the University of California Archaeological Research Facility* 20.

Nodine, Gene
1975 Bell Telephone underground right-of-way N-6487. BLM CR Report 6-31(N). Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

Paher, Stanley W.
1970 *Nevada ghost towns and mining camps*. Howell-North Books, Berkeley.

Pendleton, Lorann S.
1979 *Lithic technology in early Nevada assemblages*. Unpublished MA thesis, California State University, Long Beach.

Peterson, Fredrick F.
1981 Landforms of the Basin and Range Province: defined for soil survey. *Nevada Agricultural Experiment Station Technical Bulletin* 28. University of Nevada, Reno.

Plog, Stephen
1976 Relative efficiencies of sampling techniques for archeological surveys. In *The early Mesoamerican village*, edited by Kent V. Flannerey, pp. 136-158. Academic Press, New York.

Raymond, Anan
1982 Two historic aboriginal game-drive enclosures in the eastern Great Basin. *Journal of California and Great Basin Anthropology* 4:23-33.

Raymond, Rossiter W.
1870 *Statistics of mines and mining in the states and territories west of the Rocky Mountains*. Government Printing Office, Washington, D. C.

Reichman, Frederick
1967 *Early history of Eureka County, Nevada, 1863-1890*. Unpublished MA thesis, University of Nevada, Reno.

Roberts, Ralph J., Kathleen M. Montgomery, and Robert E. Lehner
1967 Geology and mineral resources of Eureka County, Nevada. *Nevada Bureau of Mines Bulletin* 64.

Robinson, David G.
1981a Archaeological Survey Report: Seven seismic lines in Diamond Valley. Northland Anthropological Research, Inc., Flagstaff, Arizona. [For Frontier Exploration, Inc., Denver, Colorado.]

1981b Archaeological Survey: Seismic exploration grid crossing Diamond Valley, Eureka County, Nevada. Northland Research, Inc., Flagstaff, Arizona. [For Sefel Geophysical, Denver, Colorado.]

Rock, Jim
1980 *American bottles: a few basics*. Klamath National Forest, Region 5. USDA.

Rudy, Jack R.
1953 An archeological survey of western Utah. *University of Utah Anthropological Papers* 12.

Rusco, Mary K., Jonathan O. Davis, and Andrew Jensen
1979 Archaeological investigations near Carlin, Elko County, Nevada. *Nevada State Museum Archaeological Services Reports*.

Simpson, James H., Captain
1876 *Report of explorations across the Great Basin of the territory of Utah for a direct wagon-route from Camp Floyd to Genoa, in Carson Valley, in 1859*. U. S. Army, Engineer Department, Government Printing Office, Washington, D. C.

Snyder, Charles T., George Hardman, and F. F. Zdenek
1964 Pleistocene lakes in the Great Basin. *USGS Miscellaneous Geologic Investigations*, Map I-416.

Stearns, Steven M., Larry S. Steinberg, and Thomas H. Turner
1978 Archeological survey along the Pine Valley Unit 2 Project RS-602(10) 70739-2. Ms. on file, Nevada State Highway Department, Roadside Development and Environmental Services.

Stebbins, R.
1966 *A field guide to western reptiles and amphibians*. Houghton, Mifflin Company, Boston.

Steward, Julian H.
1938 Basin-Plateau aboriginal sociopolitical groups. *Bureau of American Ethnology Bulletin* 120. Reprinted in 1970, University of Utah Press, Salt Lake City.

Steward, Julian H.
1941 Culture element distributions: XIII Nevada Shoshoni. *University of California Anthropological Records* 4(2):209-359. Berkeley.

Stewart, Omer C.
1941 Culture element distribution: XIV. Northern Pauute. *University of Caliofnria Anthropological Records* 4(3):361-446.

Stornetta, Susan
1982 Archaeological investigations along seismic lines in Grass, Pine, Garden, Denay, and Horse Creek Valleys, Lander and Eureka Counties, Nevada. Report prepared by Intermountain Research, Silver City, Nevada for Seismograph Services Corp., Elko, Nevada.

Switzer, Ronald R.

1974 *The Bertrand bottles: a study on nineteenth century glass and ceramic containers.* National Park Service U. S. Department of the Interior. U. S. Government Printing Office, Washington, D. C.

Tadlock, W. L.

1966 Certain cresentric stone objects as time markers in the Western United States. *American Antiquity* 31:662-675.

Thomas, David Hurst

1970 Archaeology's operational imperative: Great Basin projectile points as a test case. *University of California Archaeological Survey Annual Report* 12:27-60.

1971 *Prehistoric subsistence-settlement patterns of the Reese River Valley, central Nevada.* Ph.D. dissertation, University of California, Davis. University Microfilms, Ann Arbor.

1973 An empirical test for Steward's model of Great Basin settlement patterns. *American Antiquity* 38:155-176.

1979 *Archaeology*. Holt, Rinehart, and Winston, New York.

1981a Complexity among Great Basin Shoshoneans: The world's least affluent hunter-gatherers? In Affluent foragers: Pacific Coasts East and West, edited by Shuzo Koyama and David Hurst Thomas. *Senri Ethnological Studies* 9:19-52. National Museum of Ethnology, Osaka, Japan.

1981b How to classify the projectile points from Monitor Valley, Nevada. *Journal of California and Great Basin Anthropology* 3(1):7-43.

Thomas, David H.

1982a An overview of central Great Basin prehistory. In Man and environment in the Great Basin, edited by David B. Madsen and James F. O'Connell. *Society for American Archaeology Papers* 2:156-171.

1982b The 1981 Alta Toquima Village project: a preliminary report. *Desert Research Institute, University of Nevada System, Social Sciences Center Technical Report Series* 27. Reno.

1982c The colonization of Monitor Valley, Nevada. *Nevada Historical Quarterly* 25:2-27.

1983 The archaeology of Monitor Valley: 1. Epistemology. *American Museum of Natural History, Anthropological Papers* 58(1).

Thomas, David H., and Robert L. Bettinger

1976 Prehistoric pinyon ecotone settlements of the upper Reese River Valley, central Nevada. *American Museum of Natural History, Anthropological Papers* 53(3):263-366. New York.

Thomas, David H., and Edwin H. McKee

1974 An aboriginal rock alignment in the Toiyabe Range, central Nevada. *American Museum of Natural History Novitates* 2543.

Thomas, David H., and T. C. Thomas

1972 New data on rock art chronolgy in the central Great Basin. *Tebiwa* 15(1):64-71.

Thomas, Trudy

1976 Petroglyph distribution and the hunting hypothesis in the central Great Basin. *Tebiwa* 18(2):65-74.

Tibbits, John C.

1964 *1200 bottles priced. a bottle price guide, catalogue, and classification system.* The Little Glass Shack, Sacramento.

Tuohy, Donald R.

1956 Shoshoni ware from Idaho. *Davidson Journal of Anthropology* 2(1):55-71.

Turner, Thomas H., Steven M. Stearns, and Arnie L. Turner

1979 Report of test excavations and a research design proposal for mitigation of impacts to archaeological resources located on Nevada State Highway Department and Federal Highway Administration Project RS-602(10), from 16 to 9 miles south of junction with Palisade Road, E.A. 70739-2 (Pine Valley). Ms. on file, Nevada State Highway Department, Carson City, Nevada.

Vanderburg, W. O.

1938 Reconnaissance of mining districts in Eureka County, Nevada. *U. S. Bureau of mines, Information Circular* 7022.

Welch, Patrick H.

1978a Eureka community borrow pit. BLM CR Report 6-132. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

1978b FY77 exclosures. BLM CR Report 6-160-1. Report on file, Battle Mountain District Office, Battle Mountain, Nevada.

1981 An historic overview of the BLM Shoshone-Eureka Resource Area, Nevada. *Bureau of Land Management Nevada, Contributions to the Study of Cultural Resources, Technical Report* 7. Reno.

Wells, Helen F.
1978 Historical accounts of Grass Valley, 1863-1872. In History and prehistory at Grass Valley, Nevada, edited by C. W. Clewlow, H. F. Wells, and R. D. Ambro. *University of California, Los Angeles, Institute of Archaeology Monograph* 7:13-33.

Westec Services, Inc.
1980 Cultural resources survey, segments of seismic lines KO-1, AN-1, AN-2, KO-2, and KO-4, Eureka and Lander Counties, Nevada. Westec Service, Las Vegas, Nevada.

Wheeler, Geroge M.
1872 *Preliminary report concerning explorations and survey's principally in Nevada and Arizona*. Government Printing Office, Washington, D.C.

White, A. F.
1869 *Report of the State Mineralogist of Nevada for the years 1867 and 1868*. Carson City, Nevada.

Whitehill, H. R.
1873 *Biennial report of the State Mineralogist of the state of Nevada for the years 1871 and 1872*. Carson City, Nevada.

Wigginton, Eliot
1979 *Foxfire 5*. Anchor Press/Doubleday, Garden City, New York.

Yensen, Dana L.
1981 The 1900 invasion of alien plants into southern Idaho. *Great Basin Naturalist* 41:176-183.

York, Robert
1974 Test excavations and controlled surface collecting in Long Valley, Nevada. Ms. on file, Nevada State Museum, Carson City.

York, Robert
1978 Long Valley archeological study, 1978: progress report. Ms. on file, Bureau of Land Management, Nevada State Office, Reno, and Nevada State Museum, Carson City.

Young, James A., and Jerry D. Budy
1979 Historic use of Nevada's pinyon-juniper woodlands. *Journal of Forest History* 23:113-121.

Young, James A., Raymond A. Evans, and J. Major
1972 Alien plants in the Great Basin. *Journal of Range Management* 25(3):194-201.

APPENDIX I

Archaeological Site Location Maps

Federal Law requires that archaeological site location data be held confidential.

APPENDIX II

Native American Consultation Correspondence

INTERMOUNTAIN RESEARCH

Archaeology
History
Ethnohistory
Ethnography
Paleontology
Quaternary Geology

100 MAIN STREET · P. O. BOX 32 · SILVER CITY, NEVADA 89428 · (702) 847-0411

February 10, 1983

Mr. Lawrence Astor, Chairman
Inter-Tribal Council of Nevada
650 South Rock Blvd., Suite 11
Reno, Nevada 89510

Dear Mr. Astor:

Exxon Minerals Company (EMC) is proposing to acquire approximately 10,000 acres from the Bureau of Land Management (BLM) for the purpose of developing a molybdenum mine and support facilities in the Mt. Hope vicinity, twenty miles northwest of Eureka, on State Highway 278 (formerly Highway 20).

Various studies are now being conducted for inclusion in the Environmental Impact Statement which will evaluate the impacts of the proposed project. Intermountain Research (IMR) has contracted with EMC to conduct cultural resources studies for the EIS; identification of concerns that Indian people may have about the project is a significant part of our work.

The region in which Mt. Hope is located was once occupied by Indian people, traditionally the Western Shoshone. Although there are no reservation lands near the project area, it is important to determine in what ways the land there may be important to Indian people today. A map of the general project area is attached. Your comments and suggestions with regard to Indian land use, and with regard to individuals or groups who may be most directly concerned, will be especially helpful.

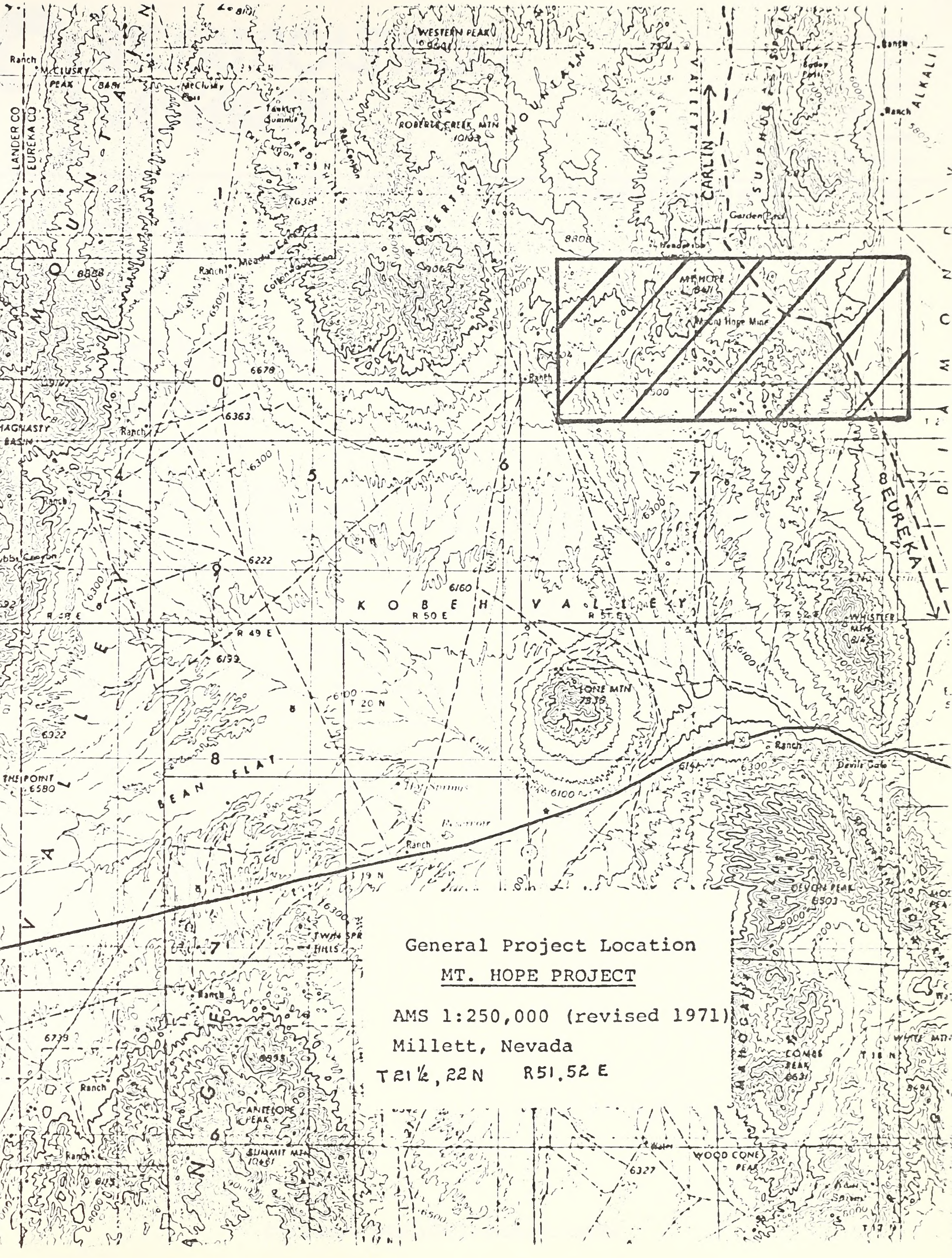
Very truly yours,

Cashion Callaway
Project Manager

CC/rw

Attachment

CULTURAL RESOURCES CONSULTANTS


WESTERN PEAK
McCLUSKY PEAK
McClusky Pass
LANDER CO
EUREKA CO
ROBERTS CREEK MTN
ROBERTS MOUNTAINS
CARLIN
Garden Pass
MT. HOPE
Mount Hope Mine
SHAGNASTY BASIN
Grubbs Canyon
KOBEH VALLEY
R 49 E
R 50 E
R 51 E
R 52 E
T 20 N
T 19 N
LONE MTN
7336
WHISTLER MTN
EUREKA
BEAN FLAT
THE POINT
6580
Devils Gate
DEVON PEAK
TWIN SPR HILLS
ANTELOPE PEAK
SUMMIT MTN
COMBS PEAK
WOOD CONE PEAK
WHITE MTN
Ranch

General Project Location

MT. HOPE PROJECT

AMS 1:250,000 (revised 1971)

Millett, Nevada

T21½, 22N   R51,52 E

INTERMOUNTAIN RESEARCH

Archaeology
History
Ethnohistory
Ethnography
Paleontology
Quaternary Geology

100 MAIN STREET · P. O. BOX 32 · SILVER CITY, NEVADA 89428 · (702) 847-0411

March 7, 1983

Mr. Jerry Millett, Chariman
Shoshone Tribe of the Duckwater Reservation
P.O. Box 68
Duckwater, NV 89314

Dear Mr. Millett:

Exxon Minerals Company (EMC) is proposing to acquire approximately 10,000 acres from the Bureau of Land Management (BLM) for the purpose of developing a molybdenum mine and support facilities in the Mt. Hope vicinity, twenty miles northwest of Eureka, on State Highway 278 (formerly Highway 20).

Various studies are now being conducted for inclusion in the Environmental Impact Statement which will evaluate the impacts of the proposed project. Intermountain Research (IMR) has contracted with EMC to conduct cultural resources studies for the EIS; identification of concerns that Indian people may have about the project is a significant part of our work.

The region in which Mt. Hope is located was once occupied by Indian people, traditionally the Western Shoshone. Although there are no reservation lands near the project area, it is important to determine in what ways the land there may be important to Indian people today. A map of the general project area is attached. Your comments and suggestions with regard to Indian land use, and with regard to individuals or groups who may be most directly concerned, will be especially helpful.

Very truly yours,

Cashion Callaway
Project Manager

ec

Attachment

Duckwater Shoshone Tribe
Tribal Government Office
Duckwater, Nevada 89314
Telephone (702) 863-0227

April 19, 1983

Cashion Callaway, Project Manager
Intermountain Research
P.O. Box 32
Silver City, NV 89428

Dear Sir,

Pursuant to the letter received by this office dated March 7, 1983.

The purpose of this letter is to inform you that the Western Shoshone and the United States are presently in the Courts over the question of who owns the land. You may wish to consider this information in your development plans.

Sincerely,

Jerry Millett

Jerry Millett, Chairman
Duckwater Shoshone Tribe

JM/ad

INTERMOUNTAIN RESEARCH

Archaeology
History
Ethnohistory
Ethnography
Paleontology
Quaternary Geology

100 MAIN STREET · P. O. BOX 32 · SILVER CITY, NEVADA 89428 · (702) 847-0411

March 7, 1983

Mr. Alvin Moyle, Chairman
Paiute-Shoshone Tribe of
the Fallon Reservation and Colony
8955 Mission Road
Fallon, NV 89406

Dear Mr. Moyle:

Exxon Minerals Company (EMC) is proposing to acquire approximately 10,000 acres from the Bureau of Land Management (BLM) for the purpose of developing a molybdenum mine and support facilities in the Mt. Hope vicinity, twenty miles northwest of Eureka, on State Highway 278 (formerly Highway 20).

Various studies are now being conducted for inclusion in the Environmental Impact Statement which will evaluate the impacts of the proposed project. Intermountain Research (IMR) has contracted with EMC to conduct cultural resources studies for the EIS; identification of concerns that Indian people may have about the project is a significant part of our work.

The region in which Mt. Hope is located was once occupied by Indian people, traditionally the Western Shoshone. Although there are no reservation lands near the project area, it is important to determine in what ways the land there may be important to Indian people today.

A map of the general project area is attached. Your comments and suggestions with regard to Indian land use, and with regard to individuals or groups who may be most directly concerned, will be especially helpful.

Very truly yours,

Cashion Callaway
Project Manager

ec

Attachment

INTERMOUNTAIN RESEARCH

Archeology
History
Ethnohistory
Ethnography
Paleontology
Quaternary Geology

100 MAIN STREET · P. O. BOX 32 · SILVER CITY, NEVADA 89428 · (702) 847-0411

March 7, 1983

Mr. Bill Rosse, Chairman
Yomba Shoshone Tribe
Yomba Reservation
Rte. 1, Box 24-A
Austin, NV 89310

Dear Mr. Rosse:

Exxon Minerals Company (EMC) is proposing to acquire approximately 10,000 acres from the Bureau of Land Management (BLM) for the purpose of developing a molybdenum mine and support facilities in the Mt. Hope vicinity, twenty miles northwest of Eureka, on State Highway 278 (formerly Highway 20).

Various studies are now being conducted for inclusion in the Environmental Impact Statement which will evaluate the impacts of the proposed project. Intermountain Research (IMR) has contracted with EMC to conduct cultural resources studies for the EIS; identification of concerns that Indian people may have about the project is a significant part of our work.

The region in which Mt. Hope is located was once occupied by Indian people, traditionally the Western Shoshone. Although there are no reservation lands near the project area, it is important to determine in what ways the land there may be important to Indian people today. A map of the general project area is attached. Your comments and suggestions with regard to Indian land use, and with regard to individuals or groups who may be most directly concerned, will be especially helpful.

Very truly yours,

Cashion Callaway
Project Manager

ec

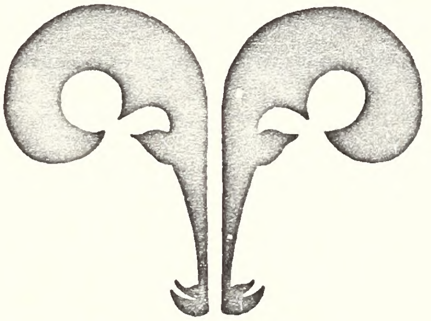
Attachment

APPENDIX 7-B

AN ARCHAEOLOGICAL SURVEY
IN THE MT. HOPE VICINITY,
EUREKA COUNTY, NEVADA:
VOLUME II

INTERMOUNTAIN RESEARCH

AN ARCHAEOLOGICAL SURVEY
IN THE MT. HOPE VICINITY,
EUREKA COUNTY, NEVADA:
VOLUME II



REPORTS

AN ARCHAEOLOGICAL SURVEY IN THE MT. HOPE VICINITY, EUREKA COUNTY, NEVADA:

VOLUME II

by

Charles D. Zeier and Susan Stornetta

Prepared Under the Supervision of
Robert G. Elston, Principal Investigator

Prepared by
Intermountain Research
Drawer A, 100 Main Street
Silver City, Nevada 89428

Prepared for
Exxon Minerals Company (EMC)
P.O. Box 4508
Houston, Texas 77210

February 1984

ABSTRACT

A Class III cultural resources survey was conducted by Intermountain Research for a proposed mining development at Mt. Hope, Eureka County, Nevada. This work was conducted in the fall of 1983 on behalf of Exxon Minerals Company, and represents the second phase of survey activities undertaken in the project area.

A total of 183 sites were recorded: 95 are prehistoric, 80 are historic, and 8 have both periods represented. For purposes of analysis, these site data were combined with information recorded during earlier survey activities. Site descriptions and the analysis of research questions are based on a combined data set of 133 prehistoric sites and 112 historic sites.

Prehistoric sites in the project area date predominately to the Reveille Phase, the period between 1000 B.C. and 500 A. D. Several site types exhibit specific distributional patterns. Overall, the data suggest that the Mt. Hope area was utilized by logistically organized hunter-gatherer groups whose primary residential camps were located elsewhere. A majority of the historic period sites document two primary themes: transportation (the Eureka and Palisade Railroad and the Eureka-to-Palisade stage route) and charcoal production.

Comprehensive recommendations are given dealing with the eligibility of the recorded sites for nomination to the National Register of Historic Places. General guidelines for additional studies are presented.

TABLE OF CONTENTS

Page
ABSTRACT ... i
LIST OF FIGURES ... vi
LIST OF TABLES ... vii
ACKNOWLEDGEMENTS ... viii

INTRODUCTION ... 1

DEFINITION OF THE STUDY AREA ... 5
  Legal Description of Study Area ... 5
  Study Priorities ... 5
    Class III Survey of Selected Areas ... 5
      Drainages ... 5
      Ridges ... 8
      Pony Express/Overland Trail ... 9
      Eureka and Palisade Railroad ... 9
      Historic Roads ... 10
    Charcoal Production Sites ... 10
    Areas Excluded From Survey ... 11

RESEARCH CONCERNS ... 12
  Prehistory Research Concerns ... 12
    Cultural Chronology ... 12
    Settlement Types ... 14
    Subsistence and Settlement Patterns ... 17
      The Kawich Mountain Shoshone ... 18
      The Reese River Shoshone ... 19
      The Mt. Hope Project Area ... 20
    Changes in Subsistence and Settlement Patterns Over Time ... 21
    Determinants of Base Camp Location in Pinyon-Juniper Woodlands ... 21
  History Research Concerns ... 22
    Transportation and Communication ... 22
    Mining ... 24
    Charcoal Production ... 24
      The Production Process ... 25
      Organization of the Production Industry ... 28
      Environmental Parameters of Charcoal Production ... 29
    Ethnic Populations ... 30
      The Italians ... 30
      The Chinese ... 33

Page
RESEARCH METHODS 35
    Field Methods 35
        Site Recording 35
        Collections 37
    Laboratory Methods 37
    Analytic Methods 38
        Artifact Type Designations 38
        Determination of Site Type 38
            Functional Site Type Classification 38
            Site Size 41
            Lithic Assemblage Variability 43
            Tool-to-Debitage Ratios 44
        Determination of Subsistence/Settlement Pattern Type 44
            Strategy 1: High Residential Mobility 44
            Strategy 2: Fusion and Fission, Within the Foraging Radius 45
            Strategy 3: Fusion and Fission, Within the Logistical Radius 45
        National Register Evaluation Methods 46
    Curation 48

ARTIFACT DESCRIPTIONS 49
    Prehistoric Artifacts 49
        Projectile Points 49
            Stemmed Points 49
            Large Side-notched Points 49
            Humboldt Series 50
            Elko Series 50
            Gatecliff Series 51
            Rosegate Series 51
            Unclassified Fragments 52
        Bifaces 53
        Drill 53
        Scraper 54
        Utilized and Modified Flake Tools 54
        Debitage 54
        Pottery 55
    Historic Artifacts 56
        Culinary Items 56
            Kitchenware 56
            Food Containers 57

Page
Personal Items 58
Medicinal 58
Spirits 58
Tobacco 59
Opium 59
Heating and Lighting 59
Firearms 59
Miscellaneous 60
Insulator 60
Rubber Gasket 60

SITE DESCRIPTIONS 70
Prehistoric Sites 70
Base Camps 70
Field Camps 72
Type A Field Camps 73
Type B Field Camps 73
Type C Field Camps 74
Locations 75
Locations With Debitage Only 76
Locations With Tools Only 76
Locations With Both Debitage and Tools 77
Locations With Only Isolated Features 77
Caches 78
Historic Sites 78
The Eureka-to-Palisade Stage and Freight Road 78
The Eureka and Palisade Railroad 82
Simple Box Culverts 82
Washed-out Culverts 85
Complex Culvert 86
Pipe Culverts 86
Bridges 86
Diversion Trench 91
Retaining Wall 91
Dugouts 91
Summit Station 94
Summit Station Water Tower 94
Garden Pass Station 95
Charcoal Production Sites 95

Page
Other Historic Sites 96
Picnicing in the Woods: A View from the Carbonari's Lunchbox 97
Ranching Related Sites 97
Mining Related Sites 98

SITE DATA ANALYSIS 99
Prehistoric Research Concerns 99
Cultural Chronology 99
Would the pre-Archaic Sites Please Stand Up? 99
Who Liked the Woods the Most? 100
Settlement Types 101
Subsistence and Settlement Patterns 106
Determinants of Base Camp Location in Pinyon-Juniper Woodlands 111
Historic Research Concerns 112
Transportation and Communication 112
The Pony Express and Overland Stage Route .. 112
The Eureka and Palisade Railroad 112
Mining 114
Charcoal Production 114
Ethnic Populations 116
The Italians 116
The Chinese 117

CULTURAL RESOURCES MANAGEMENT RECOMMENDATIONS 118
National Register Considerations 119
Proposed Testing and Evaluation Actions 122

REFERENCES CITED 125

APPENDIX A: BLM Memo of July 11, 1983.
APPENDIX B: Summary of Prehistoric and Historic Sites Recorded During the Mt. Hope Survey, Phases I and II.

LIST OF FIGURES

Page

1. Project Vicinity Map 2
2. Study Area Map 3
3. Third Order Drainages 7
4. Areas Surveyed 36
5. Site Type Key 42
6. Projectile Points 66
7. Prehistoric Artifacts 67
8. Historic Artifacts 68
9. Historic Artifacts 69
10. Prehistoric Site Map .... In Pocket*
10a. Sites in Alternate Site J .... In Pocket*
11. Historic Site Map .... In Pocket*
12. Features Along Eureka-to-Palisade Stage and Freight Road 79
13. Features and Isolates along Eureka and Palisade Railroad 83
14. Simple Box-type Culvert (26Eu787, Feature A) 84
15. Complex Box Culvert (26Eu787, Feature Y) 87
16. Washed-out Bridge Structure (26Eu787, Feature W) 89
17. Washed-out Bridge (26Eu787, Feature G) 90
18. Tyrone Creek Bridge (26Eu787, Feature L) 92
19. Detail of Tyrone Creek Bridge (26Eu787, Feature L) ... 93
20. Location of Sites Eligible or Potentially Eligible to the National Register .... In Pocket*
20a. Location of 26Eu800 .... In Pocket*

*Federal law requires that archeological site location data be held confidential.

LIST OF TABLES

Page

1. Legal Descriptions 6
2. Cultural Chronology 13
3. Winter Base Camp Site Type Determinants for the Reese River Valley 22
4. List of Cultural Materials Collected 61
5. Projectile Point Attributes 64
6. Relative Abundance of Prehistoric Site Types 70
7. Relative Occurrence of Tool Function Classes and Isolates 76
8. Artifact Loci Associated with the Eureka-to-Palisade Stage and Freight Road (26Eu794) 81
9. Isolates Recorded along Eureka and Palisade Railroad 85
10. Number of Typed Projectile Points Observed and Their Distribution Across Sites 101
11. Number of Functional Tool Classes Present by Site Type 102
12. Average Debitage Count by Site Type and Group 103
13. Average Site Area by Site Type and Group 103
14. Lithic Types in Debitage 104
15. Lithic Types in Tools 104
16. Distribution of Lithic Assemblage Variability Ratio Values by Site Type 105
17. Distribution of Debitage/Tool Ratio Values Across Site Types 105
18. Comparison of Mt. Hope Site Data With Alternate Subsistence/Settlement Strategies 107
19. Comparison of Alternate Subsistence/Settlement Strategies With Data From Separate Periods 108
20. Base Camp Locational Parameters 112
21. Sites Considered Eligible to the National Register ... 123

ACKNOWLEDGEMENTS

The design and direction of this project was a team effort shared by Robert Elston (Principal Investigator) and Charles Zeier (Project Archaeologist), with the assistance of Steven James, who prepared the overview and conducted the earlier Class II study of the project area (James and Elston 1983). Project and administrative management tasks were carried out by Cashion Callaway. The field crew consisted of Dennis Bill, Bruce Steidl, Leslie Steidl, Susan Stornetta, Mike Trinkle, and Charles Zeier.

Charles Zeier served as senior author of this report. He was assisted by Susan Stornetta, who prepared the sections on artifact and historic site descriptions.

Site form preparation was done by Susan Stornetta; cataloging of the collection was performed by Margaret Thomsen. Charles Zeier, assisted by Susan Stornetta, analyzed the site data. Eleanor Curtis provided valuable secretarial assistance.

The study was funded by Exxon Minerals Company (EMC). We are grateful for the assistance provided by Dr. Kit Krickenberger, Mr. Ken Barrett, and Mr. Paul Estee of EMC. Our liason with the Battle Mountain District of the Bureau of Land Management was Dr. Roberta McGonagle, District Archaeologist.

INTRODUCTION

Exxon Minerals Company (EMC) proposes to acquire lands in the Mt. Hope vicinity for eventual development of molybdenum mining and milling. The Mt. Hope Project is located about 32 km (20 mi) northwest of Eureka, Nevada, on State Route 278 (Figure 1). The Project Area incorporates Mt. Hope and extends east to include a small portion of the Sulphur Spring Range and Diamond Valley. Tailings Pond Site J lies south of Mt. Hope and overlooks Kobeh Valley. Most of the project area is on Federal land administered by the U. S. Department of the Interior, Bureau of Land Management (BLM), Battle Mountain District.

In the fall of 1982, EMC contracted with Intermountain Research (IMR) to conduct a Class II archaeological survey of the Mine Area and three alternate tailings pond areas. Field work was conducted in accordance with BLM guidelines (BLM 1982) and a report was submitted to EMC in June 1983 (James and Elston 1983). The purpose of the survey was to identify cultural resources in a 10% sample of the project area. Data realized from this sample survey were used to generate predictions regarding archaeological sites in the project area as a whole. This information was included in the Environmental Impact Report (EIR) submitted by EMC to the BLM. Subsequent to the EIR review, alternate tailings pond Sites B and I were eliminated from further consideration. Only the parcels referred to as the Project Area and Alternate Site J are considered herein (Figure 2). *

Analysis of the Class II site data allowed for the definition of additional cultural resource studies necessary to determine the nature and extent of future mitigative actions. An intensive survey of the entire project area was not deemed necessary to meet BLM Class III survey standards (James and Elston 1983:100-102). Since most of the recorded prehistoric and historic period sites exhibit a high degree of locational patterning, we felt an intensive survey of specific geographic and historic features would result in the identification of all major sites in the project area, the goal of a Class III survey.

---

* It should be noted that in January 1984, IMR was informed that Alternate Site J had been removed from the proposed action and that the boundaries of the Project Area had been revised to encompass a somewhat smaller area.

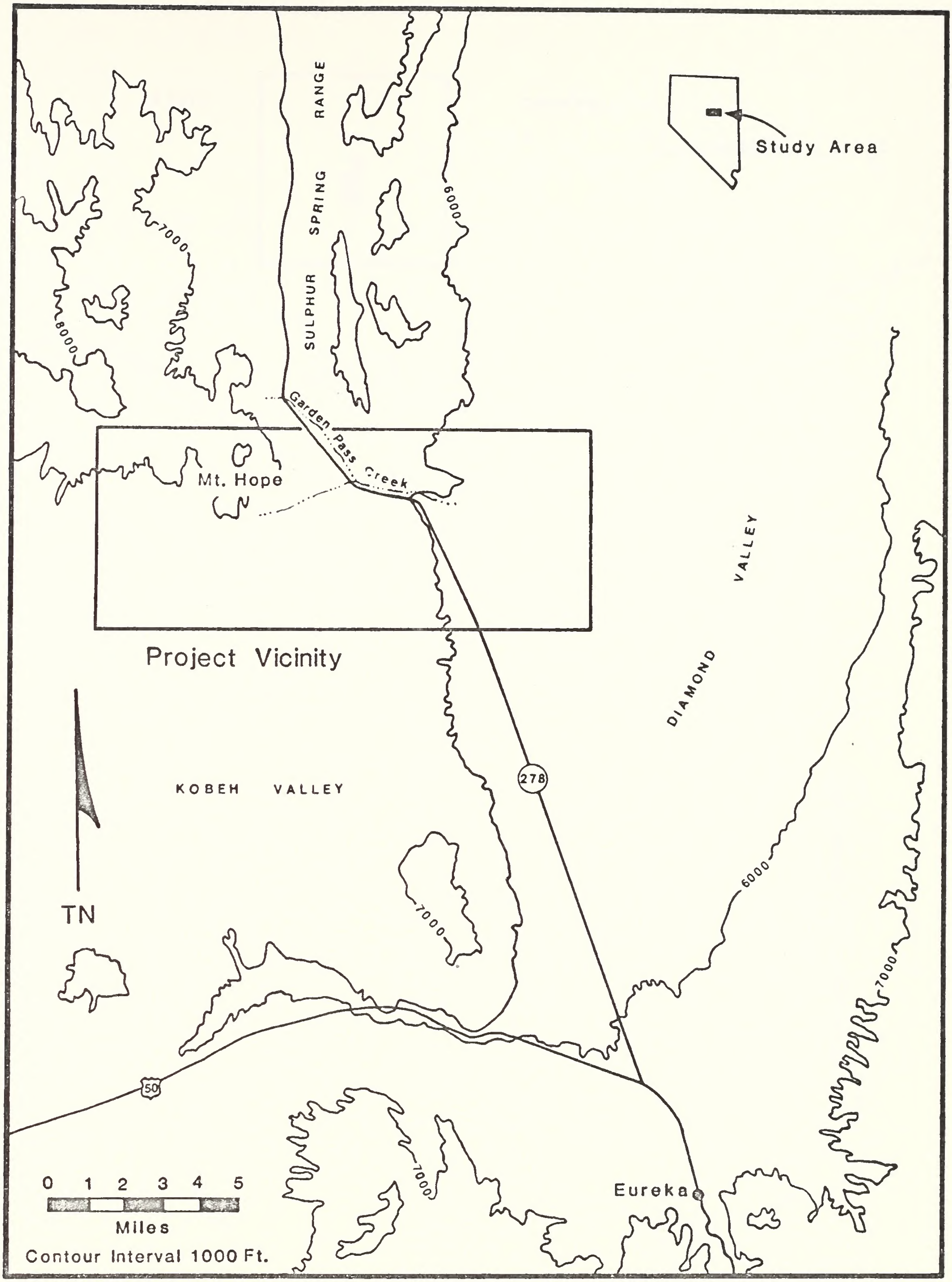
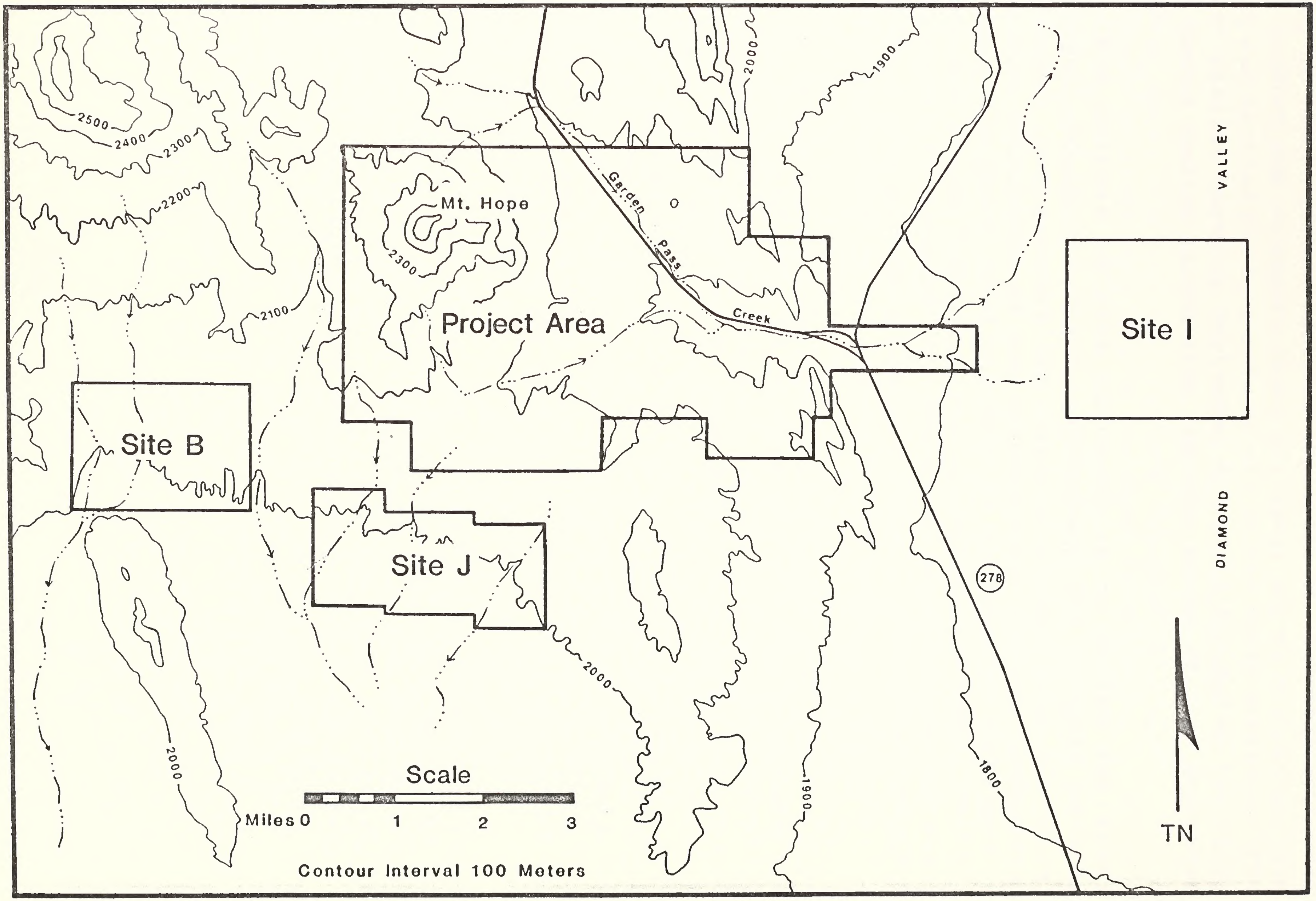

SULPHUR SPRING RANGE
Study Area
7000
8000
6000
Garden Pass Creek
Mt. Hope
Project Vicinity
DIAMOND VALLEY
KOBEH VALLEY
278
TN
7000
6000
7000
50
7000
Eureka
0 1 2 3 4 5
Miles
Contour Interval 1000 Ft.

Figure 1. Project Vicinity Map.



2500
2400
2300
2200
2100
2000
1900
1800
Mt. Hope
2300
Project Area
Garden Pass Creek
Site I
Site B
Site J
VALLEY
DIAMOND
278
TN
Scale
Miles 0
1
2
3
Contour Interval 100 Meters

Figure 2. StudyArea Map.

In August 1983, subsequent to BLM review and approval of the Class II report recommendations (Appendix A), EMC requested that IMR conduct the necessary Class III level survey activities. The work was carried out by a crew of six in two field sessions. The first session began on September 6, 1983 and ended on the 15th; the second session lasted from the 20th to the 25th of September 1983.

The purpose of this document is to define the areas surveyed; detail the field, laboratory, and analytic methods employed; and present the results of our data analysis. Extensive discussions of the environmental setting, prehistory, history, and prior investigations in the area are contained in James and Elston (1983) and are not reiterated here. Rather, this report is intended as a second volume of the earlier work. Together, they provide a complete account of cultural resource studies undertaken in the area by IMR to date.

With the major site identification phase of the Mt. Hope Project now complete, it is also our mission to address the issues of site evaluation and, as necessary, data recovery. Specific recommendations are developed in this report with regard to which sites deserve further evaluation to determine their eligibility to the National Register of Historic Places, what type and level of attention should be directed toward these sites, and what research questions and data requirements are relevant to each site. In addition, the scheduling and consultation processes required during the remaining management phases are discussed.

Archaeological investigations at Mt. Hope were conducted under the authority of the National Historic Preservation Act of 1966 (as amended) and implemented by 36 CFR Part 800, and supplementary Advisory Council on Historic Preservation guidelines; and the National Environmental Policy Act of 1969.

DEFINITION OF THE STUDY AREA

LEGAL DESCRIPTION OF THE STUDY AREA

The Mt. Hope Project Area is contained on the Garden Valley (1949) and Whistler Mountain (1956), 15 minute, US Geological Survey maps. Legal descriptions for the Project Area and Alternate Tailings Pond Site J are given in Table 1.

While in the field, the IMR survey crew encountered a BLM cadastral survey party engaged in surveying the immediate Mt. Hope vicinity depicted on available USGS maps as unsurveyed. Discussions with that party revealed that township, range, and section lines had been tentatively drawn on copies of the available quad sheets. Since it would be some time before advance sheets were obtainable, we asked if we might see their working maps. This they allowed us to do and we noted on our maps the revisions in the project area. These lines are shown in Figure 3. All legal description references for this phase of the Mt. Hope work are in accordance with the new lines. It should be noted that legal descriptions for the present work differ somewhat from those used during the Class II survey.

STUDY PRIORITIES

Recommendations regarding intensive (BLM Class III) survey activities are contained in the Class II survey report (James and Elston 1983:100-102) and are expanded below. The proposed study priorities are in keeping with a BLM memo of July 11, 1983 (see Appendix A).

Class III Survey of Selected Areas

Drainages

The Class II survey states that the distribution of prehistoric sites is restricted and that most sites of consequence can be recorded by examining specific areas. By and large, most sites were found within a limited distance of ephemeral drainages (there are no perennial streams within the project area boundaries), either in the drainage bottom, or on adjacent terraces or ridges overlooking the drainage.

Table 1. Legal Descriptions of Areas Surveyed.

Area	Legal Description	Map Reference
Project Area (10,560 acres)	T22N, R51E, Sec. 1, 12, 13, portions of Sec. 2, 11, 14, 24 (all unsurveyed) T22N, R51-1/2, Sec. 12, 13, 24, portion of Sec. 25 (all unsurveyed) T22N, R52E, Sec. 7, 8, 16, 17, 18, 19, 20, 21, portions of Sec. 9, 15, 22, 23, 27, 28, 30 (unsurveyed, except Sec. 22, 23)	USGS Garden Valley, Nev., 15' (1949); BLM Henderson Summit, Nev., 30' (1977)
Site J (1,960 acres)	T22N, R51E, Sec. 25, portions of Sec. 23, 26, 36; T22N, R51-1/2 E, portion of Sec. 36; T22N, R52E, portion of Sec. 31; T21-1/2N, R51-1/2E, portion of Sec. 36 T21-1/2N, R52E, portion of Sec. 31 (all unsurveyed)	USGS Garden Valley, Nev., 15' (1949) and Whistler Mtn., Nev., 15' (1956); BLM Henderson summit, Nev., 30' (1977)

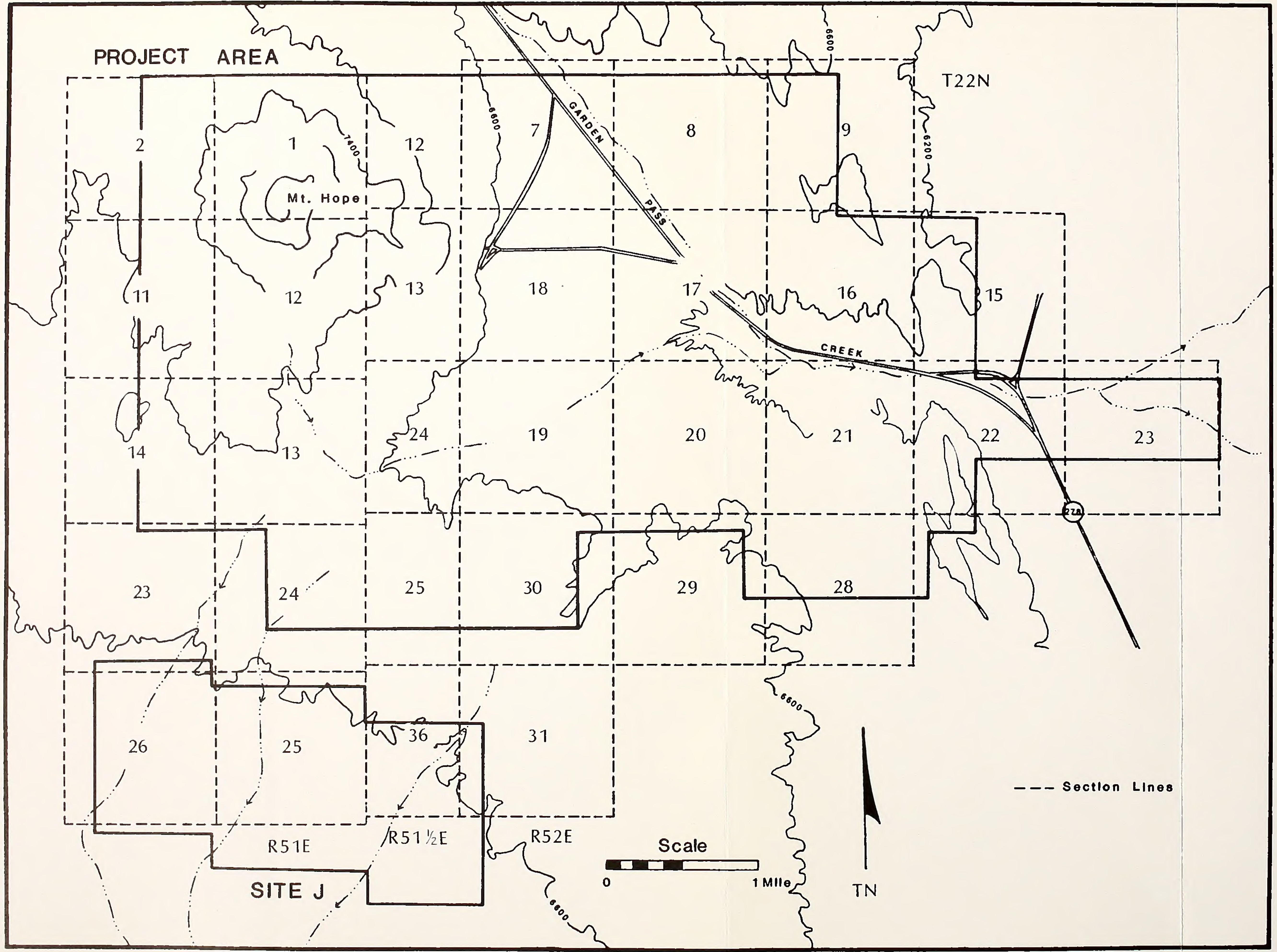

PROJECT AREA
T22N
Mt. Hope
GARDEN
PASS
CREEK
7400
6600
6200
6600
6600
6600
278
1
2
7
8
9
11
12
12
13
13
14
15
16
17
18
19
20
21
22
23
23
24
24
25
25
26
28
29
30
31
36
R51E
R51½E
R52E
SITE J
Scale
0
1 Mile
TN
Section Lines

Figure 3. Preliminary USGS Section Lines.

We chose to review drainages in the project area by channel segments as defined by stream junctures, a procedure common to the analysis and description of drainage networks. Segments are ranked in orders of magnitude. First order segments are the smallest drainages and include the length from their point of origin to the first point of juncture. The junction of two first order drainages produces a segment of the second order; two second order drainages, a third order segment, and so on.

The majority of drainages in the Mt. Hope Project area are of the first order. Portions of Garden Pass and Tyrone Creeks are the only apparent second order drainages, and the segment from the point where the two join and then flow into Diamond Valley is the sole third order drainage. The third, second, and many first order stream segments are depicted on USGS maps as ephemeral drainages (blue line features).

We decided that one focus of survey activity would be blue line features on the USGS quad sheets. This involved approximately 20 miles of drainage in the Project Area and 4 miles of drainage in Alternate Site J. To insure that the ridges to either side of each drainage were also surveyed, we decided to use a 350 m wide survey corridor centered on each stream cut. A majority of the first order drainages associated with the blue line features are short and fall within the 350 m wide survey corridor.

Ridges

During the Class II survey, two ridge areas were identified (James and Elston 1983:100) as sensitive due to the high site density observed on each:

1. the area from the head of Tyrone Creek west to the boundary of the Project Area; and,
2. the area between McBrides Spring and the gap in the Sulphur Spring Range through which the Pony Express route passes.

To deal with the first area, a Study Unit was defined which includes T 22 N.; R51 E.; Section 11, SE 1/4; Section 12, SW 1/4; Section 13, W 1/2; and Section 14, E 1/2 (as defined on the 1949 Garden Valley, 15 minute, USGS map). It was decided that this Study Unit would be examined using a combined strategy of

transect and intuitive survey techniques, focusing on areas of suspected high site density. Survey of the second area was to be accomplished in accordance with other tasks as discussed herein (ie., drainage surveys, the Pony Express route).

Pony Express/Overland Trail

As documented in James and Elston (1983:30), the Pony Express/Overland Trail crosses the Project Area. Maps (BLM 1975) allow us to estimate the Pony Express route. On the eastern margin of the project area, the route appears to proceed up a small gap in the Sulphur Spring Range about two miles north of where Garden Pass Creek flows into Diamond Valley. This route crosses Garden Pass Creek near the juncture of that stream and Tyrone Creek. From there the route follows Tyrone Creek to where the stream makes a sharp turn to the north. At this point the route continued west, apparently over a series of low saddles and into Kobeh Valley. The same route was also followed by the first transcontinental telegraph line, which was responsible for the demise of the Pony Express.

Today, this route is evidenced by an unimproved dirt road(s). The Pony Express made extensive use of transportation corridors already in use by the Overland Mail and Stage Line and, consequently, these roads may be as old as the Overland route.

The Pony Express played a prominent role in the history of communications in the United States. Special care was taken to identify remnants of its presumed route through the project area. To do this, a 100 m wide corridor was to be surveyed, centered on the dirt roads that presently mark the Pony Express route.

Eureka and Palisade Railroad

Approximately 4.6 miles of the historic Eureka and Palisade Railroad corridor are present in the Project Area. The railroad saw its greatest use during the Eureka boom years (1870s and 1880s). As of 1880, the railroad boasted 5 engines, 2 coaches, 2 cabooses, 2 baggage cars, 21 box cars, 95 flat cars, and 10 hand cars (Thompson and West 1881:285). In 1910 a flood washed out over 11 miles of the grade (Myrick 1962:100; Mordy and McCaughey 1968:87). In the project area, the washout caused an engine to derail and become mired near Garden Pass. The engine was not extracted until 1912 when the entire line was restored (Myrick

1962:101). Tri-weekly runs between Eureka and Palisade continued from 1912 until the route was abandoned in 1938.

Two railroad stations identified on a 1935 map of Eureka County prepared by the Nevada State Engineer's Office are located within the Mt. Hope Project Area. These are the Summit and the Garden Pass stations. The former was located during the Class II survey, recorded as Eu787 and called the "Mt. Hope Station." Since the name Summit seems to have historic precedence, we hereinfter use it. The Garden Pass Station has previously been recorded by the BLM as "20 Mile Shack" and assigned the number Eu1051.

The documentation of features along the railroad grade and sites associated with it is an important part of the present study. A 200 m wide corridor was to be surveyed along the length of the grade, centered on the rail bed.

Historic Roads

Two major roadways present in the project area date to the late 1800s. The first runs east/west. This is the dirt road that forms part of the presumed historic Pony Express route.

The other road runs north/south through the project area. The northern terminus of this road appears to be the Summit Station. South of the station, the road parallels the rail line, crosses Tyrone Creek, and then swings away from the railroad and travels up a small, unnamed ephemeral drainage that leads into the southern tip of the Sulpher Spring Range. This road passes near Stinking Spring and heads out into Diamond Valley, again connecting with the Eureka and Palisade Railroad at Diamond Station. A 100 m corridor was to be surveyed of the portion of the road located within the project area. The corridor was centered on the historic roadway.

Charcoal Production Sites

During the Class II fieldwork, ten historic charcoal production sites were identified (James and Elston 1983:59-60). Subsequent laboratory analysis revealed that certain of these sites are visible on aerial photographs and exhibit a particular signature. A careful examination of the aerial photographs for the vicinity surrounding the Project Area and Alternate Site J

resulted in the location of seven similar signatures; six in the Project Area and one in Alternate Site J. An additional 14 were identified to the south of the Project Area and to the east of Alternate Site J.

A field check of the likely site areas identified through examination of the aerial photographs was to be made to determine if they are coal production locations. If so, they were to be recorded and compared to other similar sites. The primary purpose of this activity is not necessarily to record more charcoal camps, but rather to test the efficacy of aerial photographs as a tool for locating such features.

Areas Excluded From Survey

The historic Mt. Hope Mine, the corridor along which State Route 278 will be relocated, and other project-related rights-of-way and facilities are not considered herein. Pending administrative decisions dictate that these survey tasks be completed and reported separately.

RESEARCH CONCERNS

A research design for the Mt. Hope Project, consistent with others developed for the region, is presented in James and Elston (1983:40-50). The research documented herein relies heavily on the design developed by James and Elston. To the extent possible, refinements have been incorporated into each study topic. While the final resolution of many research questions is beyond the scope of the present effort, we hope to further their cause as best we can. Each research concern is discussed below.

PREHISTORY RESEARCH CONCERNS

Cultural Chronology

An outline of the prehistoric cultural chronology for the project area is depicted in Table 1. Chronological divisions indicated are those developed by Thomas (1983). Also included are the general adaptive strategies thought to have been operative in the region over time, the pre-Archaic (11,000-8,000 B.P.), Archaic (8000 B.P.-A.D. 1300), and Numic (A.D. 1300-ca. A.D. 1850).

One chronology-related research issue raised during the Class II survey deals with how many pre-Archaic period sites might be expected to exist within the Project Area. To date, evidence of such sites is rare in the central Great Basin: Thomas maintains that intensive aboriginal occupation in the region is only 5000 years old (Thomas 1982:161). Generally, pre-Archaic sites are associated with pluvial lakes of late Pleistocene and early Holocene age. Thomas bases his statement on work conducted in Reese River and Monitor Valleys, in which large pluvial lakes did not exist. Valleys in the central Great Basin that did contain pluvial lakes should contain pre-Archaic sites. For example, research conducted in Grass Valley by Elston (1982) has located an extensive pre-Archaic site on an early Holocene shoreline.

Diamond Valley, east of the project area, contained a pluvial lake at various times. We thought that pre-Archaic period sites might be present there, especially in Alternate Tailing Site I on the valley margin. However, none were located there or elsewhere during the Class II survey (James and Elston 1983:92). These findings notwithstanding, we thought it possible pre-

Table 2. Cultural Chronology for Central Nevada (Modified from Thomas 1983:Table 7; Davis 1982:Table 2).

Adaptive Strategy	Chronological Phase	Age	Diagnostics	Climate
Historic		A.D. 1850-1930	Various historic debris--e.g., hole-in-top cans, 3 piece mold bottles, Chinese ceramics	
Numic	Yankee Blade	A.D. 1300-1850	Desert Side-notched and Cottonwood series points, Shoshonean ceramics	Late Holocene; moderate winter precipitation
	Underdown	A.D. 500-1300	Eastgate and Rose Spring (Rosegate) series points	Late Holocene; low effective precipitation
Archaic	Reveille	1000 B.C.-A.D. 500	Elko series points	Late Holocene; moderate winter (and summer?) precipitation
	Devils Gate	3000 B.C.-1000 B.C.	Pinto series and Humboldt Concave Base A points	Middle Holocene; very low winter (?) precipitation, followed by moderate summer and winter precipitation
	-----	6000 B.C.-3000 B.C.	Northern Side-notched points stemmed and concave base points	Middle Holocene; moderate summer precipitation
Pre-Archaic	-----	9000 B.C.-6000 B.C.	Great Basin Stemmed series and Paleoindian points; crescents	Early Holocene; high effective winter precipitation but decreasing

Archaic sites may be observed during the intensive Class III effort. Therefore, we have retained the research questions relating to the pre-Archaic.

An issue related to the pre-Archaic is the relative emphasis placed on the use of upland resources. Alternative pre-Archaic subsistence patterns have been proposed. These emphasize large game hunting (Tuohy 1968, 1974), the use of lacustrine resources (Heizer and Baumhoff 1970; Bedwell 1973), or a more varied mix of upland and lacustrine resources (Davis 1978). Work conducted in Long Valley, 50 miles east of Mt. Hope, revealed clusters of pre-Archaic sites where streams flowed into the pluvial lake present at that time (York 1974:13). York (1974) recorded few sites outside of such contexts, although upland sites do exist. Smith Creek Cave in eastern Nevada (Bryan 1979) and Last Supper Cave in northern Nevada (Layton 1970) are cases in point.

The Project Area is in an upland area and could have been exploited out of a lacustrine settlement system based in Diamond Valley. The archaeological signature of such hunting forays would be reflected in "stations" where information was gathered (i.e., lookout stations) and "locations" where animals were killed and butchered. These site types frequently contribute little to the archaeological record. If camps were established, they would most likely be linked to available water sources.

The final chronology-related research issue involves the extent to which the project area was used during the various cultural periods. Of the 17 site components assigned to a cultural period during the Class II survey, 47.1% fell within the Reveille Phase and 17.6% are in the Underdown Phase, both of the Archaic Period; and 17.6% in the Yankee Blade Phase of the Numic period. The remaining 17.6% of the components contain Humboldt projectile points that are Archaic in age, but which otherwise are poor indicators of exact temporal placement (Thomas 1981; James and Elston 1983:91-92). These results suggest that Archaic Period sites account for 82.4% of all identifiable components in the project area. This was accepted as a hypothesis that could be verified during the Class III survey.

Settlement Types

Binford (1980) has developed a series of settlement-subsistence types that characterize hunter-gatherers on the basis

of their food procurement strategies. At the lower end of his spectrum are foragers who gather food on a daily basis and practice little or no food storage. Foragers move to the resources. As a result, residential mobility is high. Further up the continuum are collectors who place a greater emphasis on logistical organization in the quest for resources. In general, collecting moves the resource to the people, allowing a greater degree of residential stability. Primary residential emphasis is placed on the base camp which serves as a focus of most subsistence activities. The acquisition of distant resources is facilitated by the establishment of temporary camps in the area of the sought-after resource. Collectors are able to subsist on stored foods for at least part of the year.

The types of sites created by these adaptive systems include residential base camps, temporary field camps, locations, caches, and stations. Base camps are large residential sites that were occupied for an extended period (several weeks, months, or even longer). Drawn largely from Binford (1980) and Thomas (1983), the following observations are relevant regarding the archaeological signature of residential base camps:

1. Features associated with residential activities (i.e., house structures, caches, hearths) will be most abundant at base camps.
2. Food preparation artifacts tend to occur only at residential base camps or frequently reoccupied field camps.
3. The residential base camp is the primary location for tool preparation and repair and the proportion of fabrication type artifacts will be higher here than in other site types. Therefore, lithic debitage at a residential base camp will reflect a wider array of reduction activities.
4. Gould (1980:126) observes that non-locally available, quarried lithic materials are more likely to be transported to Residential base camps than to other site types.
5. Thomas (1983:78) suggests that field camps may contain an abundance of discarded tools and very little manufacturing debris, or just the opposite. Residential base camps, on the other hand, will have lots of both.

6. Non-essential items (recreational and ceremonial artifacts) will be found most frequently at residential base camps.
7. Winter base camps are more abundant on the west facing slopes of the valleys (eastern margins). These slopes receive more precipitation due to localized orographic effects (Thomas 1983:31).

Field camps were occupied for shorter periods of time than residential base camps, often only overnight, and the number of activities occurring there was limited. Whereas base camps were logistically situated with regard to shelter, water, and a ready supply of firewood, the location of field camps was most often determined by the nature and distribution of the resources sought by the procuring party. These observations are relevant regarding the archaeological signature of field camps:

1. Field camps are most often short-term, task-specific sites, and intercamp artifact content will be highly variable.
2. More often than not, either harvesting equipment or weapons will be present, but seldom will both be found together.
3. Artifacts present will consist mainly of specialized forms that are highly curated.
4. Features such as caches will be infrequent.
5. Many smaller field camps will probably never be observed by the archaeologist (Yellen 1977:80).

Locations (often referred to as task sites) were occupied for the purpose of procuring and/or processing specific resources. Due to the very particular and short-term nature of the procurement, some activities (i.e., pinyon harvesting and plant gathering) may not leave sufficient physical evidence to be preserved in the archaeological record. Other activities, such as butchering and hunting, might leave behind a small number of material items. Foragers and collectors will differ with regard to the number and distribution of locations. Collectors will employ a large number of locations distributed widely around their residential bases and field camps. Foragers, on the other hand, will make less use of locations because of their higher degree of residential mobility. Facilities such as game fences were seldom constructed by foragers.

Information on site types present in the project area was required in order to conduct other analyses discussed below. Which sites could be assigned to which types? How abundant is each type? Are there locational paramenters associated with the observed distribution of each type?

Subsistence and Settlement Patterns

Hunters and gatherers respond to economic seasons (Jochim 1976:45), periods during which specific resources become available. Subsistence and settlement patterns can best be viewed as "positioning strategies" (Binford 1980:15) that allow the group to respond to seasonal variability of resources. Demographic configurations (group size and composition) are structured, in large part, by this resource procurement strategy.

On an idealized level, positioning takes place within a series of economic zones that radiate from the residential base (Kelly 1980; Binford 1982; Thomas 1983): campground radius, foraging radius, logistical radius, and the extended range. The foraging radius includes that area regularly exploited by task groups working out of a residential base camp. The logistical radius encompasses the area beyond the foraging radius which requires staying away from the base camp overnight or for a longer period. Such excursions require the establishment of field camps in addition to task specific locations. The extended range is "the area commonly monitored relative to resource abundance and distribution" (Thomas 1983:89). Movement into this area is on a need basis. If resources within the logistical radius prove inadequate (failure of the pinyon crop, for example), then the group, or part thereof, will move into some portion of the extended range. The more reliable the resource base, the less likely such moves will take place. In such situations, the logistical radius may become a social boundary.

The identification of such positioning patterns in the Mt. Hope area is a basic research concern. A substantial amount of work has been done in the central Great Basin regarding such patterns (Clewlow and Pastron 1972; Thomas 1971, 1972, 1973, 1982, 1983; Thomas and Bettinger 1976). This work is particularly important since so little of the available ethnographic information is directly applicable to the Mt. Hope area.

The Kawich Mountain Shoshone

Thomas' discussion (1983:27-30) of the Kawich Mountain Shoshone is a case in point. The Kawich Mountains (located some 80 miles east of Tonopah) are similar to Mt. Hope in elevation and the lack of perennial streams. Both areas have extensive pinyon-juniper woodlands, although those in the Mt. Hope area are probably more dense. Thomas (1983:36) states that pinyon in the Kawich Mountains tend to be scattered and erratic, providing only a marginally reliable source of food.

Steward (1938:49) suggests that only 90 to 120 persons lived in this area; a density among the lowest in the Great Basin one person per 17 to 22.5 square miles. Steward reports that these people were divided into 15 to 20 families; each encampment consisted of two or three families (Steward 1938:111-112). Ethnographic data (Steward 1938; Thomas 1983) provide clues to subsistence and positioning patterns:

1. In the absence of perennial streams, residential base camps were established near springs.
2. Groups occasionally established winter camps higher in the mountains if pine nuts were abundant. This allowed the use of snow as a water source.
3. Pinyon collection was undertaken by task groups moving out of the residential base camp located within the pinyon-juniper woodland.
4. In years of pinyon crop failure, the group moved out of the Kawich Mountains altogether and into another range where pine nuts were available.
5. Subsistence activities outside the pinyon-juniper woodland were restricted largely to spring and summer months. Summer resources in the area were sparse, scattered, and of low predictability, requiring a greater degree of travel over larger areas.

Thomas (1983:29, 35) concludes that the Kawich Mountain Shoshone were foragers and that winter base camps and foraging locations will be the predominant site types found in the pinyon-juniper woodland. He feels that frequent residential moves were required and that this should be reflected archaeologically by a large number of relatively small base camps. Field camps will be restricted to areas outside the foraging radius of the group; they should be infrequent in the pinyon-juniper woodland.

Thomas (1983:89-90) suggests that the Kawich Mountain Shoshone had a foraging radius of about 8 to 10 km around each residential camp, a lesser emphasis on a logistic radius due to camp mobility (forager style), and a large extended range (perhaps as high as 120 km). He adds that camps were probably located at waterholes, so that moving camp from one base to another usually involved a substantial distance. The implication of all this is that archaeological sites in the Kawich Mountains should exhibit a distinct distributional pattern and a great deal of consistency, all sites looking more or less alike.

The Reese River Valley Shoshone

Thomas contrasts the Kawich Mountain Shoshone with Reese River Valley groups. Perennial streams are present and the Reese River Valley contains more resources than surrounding valleys. The population density was quite high, about one person for every 3.6 square miles (Steward 1938:49). Winter residential bases frequently were reoccupied and associated with particular groups. Resource abundance and predictablity developed here to a degree not found in the Kawich Mountains.

To the extent possible, base camp movement was minimized. If the level of cached pinyon nuts allowed, even summer collecting activities were conducted from the winter camp (Thomas 1983:31). Otherwise, summer saw the dispersal of the groups across the valley floor. Steward (1938:104) and Thomas (1983:31) discuss the prehistoric practice of the deliberate burning of brush in upland basins behind winter residential bases and the sowing of *Mentzelia* and *Chenopodium* seeds for summer harvest. Steward suggests this was a common practice throughout central Nevada.

Thomas (1983:31, 35, 89) views the Reese River Shoshone as employing a mixed forager-collector subsistence strategy. Winter saw an emphasis on a collecting strategy where resource acquisition, organized logistically, focused on the strategically located residential base camp. During summer, a more forager-like strategy was employed, with increased residential mobility. He suggests that the foraging radius for the Reese River Shoshone was 6 to 8 km from the residential base camp, with a logistic radius of about 60 to 80 km. Base camps were situated so that valley floor resources were available within the foraging radius.

The Mt. Hope Project Area

We are concerned here with the role that the Mt. Hope vicinity played in local prehistoric subsistence and settlement patterns. Ethnographic evidence for the locale is limited; Steward (1938:Fig. 11) indicates that very little ethnographic activity occurred here. The few camps noted are located to the north along the edge of the Roberts Mountains, the Sulphur Spring Mountains, or in Diamond Valley. Antelope drives took place in southern Diamond Valley. Steward (1938:142-143) makes several observations regarding the area that are of interest:

1. There was no ownership of pinyon areas (territoriality was not well developed).
2. When local pinyon crops failed, people went as far south as Austin (an indication of the large size of the extended range).
3. During pinyon harvesting, emphasis was placed on moving the harvest back to the residential base, suggesting that little emphasis was placed on the caching in the area of procurement.
4. Fission, the splitting of the main residential group into smaller bands, took place in the spring with family groups moving out into the valleys to forage.

Thomas (1983:139-140) identifies several subsistence settlement models that may be of value in our examination of the Mt. Hope data:

1. A forager strategy of high residential mobility similar to that of the Kawich Mountain Shoshone.
2. A strategy of seasonal fusion and fission similar to that of the Reese River Shoshone, the Mt. Hope area being within the foraging radius.
3. A strategy of seasonal fusion and fission similar to that of the Reese River Shoshone, the Mt. Hope area being within the logistical radius but not the foraging radius.

The limited ethnographic information about the Mt. Hope area seems to provide clues supportive of each of the three models. We viewed these models as propositions which could be investigated through an anlaysis of site types and their distribution in the project area.

Changes in Subsistence and Settlement Patterns Over Time

Another prehistoric research topic deals with changes in settlement-subsistence patterns through time. If Thomas (1982a) is correct, these patterns have been relatively stable over the past 5500 years and are essentially the same as those recorded ethnographically for the Western Shoshone.

In Grass Valley, just to the west of the Mt. Hope area, Clewlow and Pastron (1972) found that different periods in prehistory exhibited distinct settlement patterns. The Early Archaic (which they refer to as the early prehistoric) is characterized by only a limited number of sites, most of which appear to be hunting-related. These are situated along the western edge of the valley near where streams flowed into pluvial features then present. Far more sites were found dating to the Middle Archaic, and all site types are present. Base camps are located near permanent water sources while the remaining site types are distributed along the valley edge. The same general pattern seems to extend into the Late Archaic, although gathering-related locations far outnumber hunting locations.

A similar degree of variability has been documented in other areas of the Great Basin (see Elston 1982; Lyneis 1982; Madsen 1982). Do the Mt. Hope data suggest that upland areas were used in different ways by the Archaic and Numic adaptive strategies? Do the early, middle, and late Archaic periods differ from one another with regard to subsistence and settlement patterns in the area? Does the relative site type mix change from one cultural period to the next?

Determinants of Base Camp Location in Pinyon-Juniper Woodlands

Thomas and Bettinger (1976:271-273) discuss residential base camp location determinants in the pinyon-juniper woodland zone; their area of research concern was the Reese River Valley. They identified seven criteria that served to determine the location of major winter base camps and field survey revealed that the criteria are very accurate indicators of site location. Thomas and Bettinger (1976:358-361) provide statistical observations for certain of their criteria (Table 3) and suggest that they may be of use elsewhere in of the Great Basin.

Table 3. Winter Base Camp Site Type Determinants for the Reese River Valley.

Criterion	Mean	Standard Deviation	n
Slope	8.4%	4.2%	65
Distance to Water	451 m	355 m	65
Distance to Ecotone	521 m	357 m	65
Elevation Above Valley Floor	95m	63 m	65

Certain of these variables were recorded during the Class II and Class III Mt. Hope surveys. If base camps are identified in the project area, then these data can be arrayed to discover if similar determinants were operative at Mt. Hope.

HISTORY RESEARCH CONCERNS

Transportation and Communication

The historical overview of the region (James and Elston 1983) indicates that several discrete activities have taken place in the study area. In the early historic period, between 1859 and 1869, major transcontinental transportation and communication routes passed through the region. These included Simpson's initial development of a wagon route in 1859, Chorpenning's mail carrier, the Pony Express trail, the Overland Stage route, and the first transcontinental telegraph line. After 1869, a stage and freight line was developed over Garden Pass between Palisade and Eureka; in 1875 the Eureka and Palisade Railroad (a narrow gauge line) was completed along the same general route. The archaeological examination of such systems should focus on the level and nature of the technology involved, its social and economic implications, and the ecological impacts of the system on the surrounding terrain (Edaburn 1982:246-247).

The Eureka and Palisade Railroad, of all the transportation systems in the project area, offered the best opportunity for developing this information. Construction of the railroad began in December 1873 with a crew of "58 white men and over a hundred Chinese veterans of the Central Pacific" (Kneiss 1963:84). Work progressed as far as Alpha in Pine Valley before being temporarily halted. Construction did not resume until the spring

of 1875. By June of that year, the route had been located as far as Summit and construction of the roadbed to this point was in progress. By the end of September, rails had been laid almost as far as Garden Pass. October saw the crews well on their way to Eureka. In an effort to speed construction during this period, "more men were put on; five hundred were now feverishly molding the alkali ground into a railroad grade. All except the scraper drivers were Chinese" (Kneiss 1963:88).

Kneiss (1963:88) reports the Chinese complained about the intense pressure to complete the job; at one point they refused to work. The construction foreman laid off the water carriers and according to Kneiss (1963:88) "...a few dry hours in the desert sun burned out the strike."

We intended to examine the technological aspect of extant features along the line in the project area. In addition, there were undoubtedly work camps associated with railroad construction; their identification might tell us about the people who built it. A timetable for the Eureka and Palisade Railroad, presented by Myrick (1962:99), gives the distances between stations in rail miles. The Garden Pass and Summit stations are described as being 6 miles apart; Garden Pass is 21 miles out of Eureka, and Summit is 27 miles. Both are located within the project area. The significance of the two stations must be addressed, especially in light of their economic implications. Not only were they places for trains to stop for fuel and water, they were also foci from which other economic ventures could develop. The Eureka and Palisade Railroad continued operation until 1938; Bowers and Muessig (1982:76) state that the tracks were removed for scrap during World War II.

Specific research questions relating to the Eureka and Palisade Railroad include:

1. Several features associated with the railroad are present in the project area. Is there a consistency in design, materials,and workmanship between features?
2. Two stations are present in the project area. Is there evidence of structures (residential and/or railroad related) at either? What other features are present?
3. Frequently, ranches served as a focus of habitation by remnants of the local Indian populations. Did railroad

stations in the Mt. Hope area serve a similar purpose? Are ethnographic period sites present at or near the stations?

4. Did construction of the railroad foster any major environmental change in the project area?

Compared to the railroad, less material evidence documents the existence and character of historic roads and the Pony Express/Overland Stage route. Therefore, research questions regarding these are a bit more basic:

1. Are artifacts present along the suspected historic roads and the Pony Express/ Overland Stage route that would serve to clearly identify them as being historic?
2. If not, is such evidence present elsewhere in the project area?

Mining

Mining in the project area appears to have been going on intermittently since 1886. The most extensive activities, however, occurred during the 1930s and 1940s and were restricted to the existing Mt. Hope Mine, although James and Elston (1983:35) suggest there may have been earlier mining activity there. The Leopold District, active in the 1870s, is reported to have been located somewhere within or near the project area (James and Elston 1983:35).

Specific research questions relating to historic mining include:

1. Is evidence of pre-1930 mining present at the Mt. Hope Mine complex and, if so, to what degree?
2. Is there evidence present at the Mt. Hope Mine complex that reflects the range of technological developments ongoing during its period of use?
3. If evidence of the early (1870s) phase of mining is not present within the Mt. Hope Mine complex, are remains to be found somewhere else in the project area?

Charcoal Production

The historic record documents the fact that large tracts of pinyon-juniper woodland were decimated for use as firewood,

fenceposts, and mining-related charcoal production. The smelting of ore in Eureka required an enormous amount of charcoal: the two major smelters each used as much as 4,600 bushels of charcoal per day (Murbarger 1965:26). Thompson and West (1881:438) state that the annual consumption of charcoal in Eureka was around 1,200,000 bushels. Therefore, production of this commodity became an important local support industry.

The Production Process

The purpose of charcoal production was to carbonize wood through controlled combustion. Charcoal was less bulky than the fuel in its natural state. How was the charcoal actually produced? The general technology of earthen pit ovens is described in Young and Budy (1979:116; see also Elston, Hardesty, and Zeier 1982:22-24).

First of all, the term 'charcoal pit', used in the literature, is misleading. Most such features were above ground and not in excavated pits; at most, a certain amount of leveling was undertaken on the burning site prior to construction of a temporary surface oven. The use of permanent kilns was restricted to the reduction of juniper and woods other than pinyon that required higher temperatures than could be maintained in a temporary oven. Bowers and Muessig (1982:61) report that only three known kilns are present in the Eureka area; all are to the south towards the Tybo mining area. Kilns were quite large and should not be difficult to recognize archaeologically. "The height of a kiln was equal to its diameter, which could range from 16 to 26 feet, and wall thicknesses ranged from 30" at the base to 12-18" at the top" (Bowers and Muessig 1982:61)

Since no kilns had been observed in the project area, we planned to focus our attention on the pit form of charcoal production. A composite description of this technique can be developed, based on historic literature. Grazeola (1969:28-29) states that a rock platform was built to elevate and level the pit. Once the ground surface had been prepared, wood was stacked on end around a central chimney; only the top layer of wood was laid flat. Overall, the pit took on the shape of a dome. Once the wood had been stacked, it was covered with combustible grasses and twigs, then with mud, and finally with a layer of clay that would form an airtight seal around the wood (Young and Budy 1979:116). Small holes were cut through the

bottom of the earthen skin and a chimney built in the top to provide draft and allow burning to be controlled. Murbarger (1965:26) indicates that pinyon was burned green. He adds that the stacked wood was allowed to burn for a time (unspecified) before being smothered with earth.

Management of the burn required considerable skill. Control was exercised by regulating the air flow through small ports at the bottom of the structure. Burning conditions were judged by watching the color of the smoke emanating from the chimney. A ready supply of wet clay was maintained to repair cracks in the oven wall as they developed (Young and Budy 1979:116). Given the four-fold reduction in volume that took place over the course of the burn, this must have been a regular problem. If substantial cracks were left untended, increased air flow could turn a smoldering oven into a flaming inferno, thus the pits had to be watched night and day while burning. A 100 cord oven required some 3 to 4 weeks to burn. Once the charcoal reached the desired stage, all the openings were closed off and the fire smothered, cooling took seven to ten days. If unsealed too soon, the charcoal might reignite and burn up (Young and Budy 1979:117).

Charcoal burners were looked upon as the dregs of the labor market (Murbarger 1965:26). The nature of the work forced them to spend most of their time away from settled communities, camping near or at production sites, referred to by Earl (1969:55) as 'charcoal ranches'. Colliers lived in temporary huts, or in dugouts (Murbarger 1965:26) or tents (Grazeola 1969:30). Reichman (1967:83) states that "Italians lived in wickiups throughout the hills around Eureka."

The archaeological implications of this description of charcoal production are clear:

1. Ovens would be built on level or leveled areas; a rock platform may be present.
2. Areas around the pit may have been cleared for a distance of 50 feet.
3. The sandy soils typical of upland areas would not work well as a sealing skin for the ovens, therefore, clay soil may have been imported to the site. An alternate source of finer-grained materials may have been stream beds in the immediate area.
4. Evidence of a collier camp should be present.

Earl (1969:52) reports that one acre of mature trees yielded 8 to 10 cords of pinyon and that one cord of pinyon yielded 28 bushels of charcoal (see also Bancroft 1890:285). Murbarger (1965:26) suggests a yield of 25 bushels per cord. Thus, an acre of trees would yield from 200 to 280 bushels of charcoal. Young and Budy (1979:117) suggest that pinyon yield per acre may vary anywhere from one to 12 cords, but hasten to add that areas in the low yield range would probably never have been commercially exploited. They state that 300 bushels of charcoal per acre of woodland may be a reasonable average.

Charcoal consumption is reported to have been as high as 1,200,000 bushels of charcoal per year (Nevada State Legislature 1879). Using the above conversion factors, this would have required 42,857 cords of pinyon, somewhere between 4,285 and 5,355 acres of woodland. Earl (1969:52) reports that by the end of 1873 all the pinyon woodlands in a 20 mile radius around Eureka had been stripped. By 1878, this area had expanded to include a radius of 50 miles.

Charcoal pits held as much as 100 cords (or 12,800 cubic feet) of split, stacked pinyon (Murbarger 1965:26). Assuming it took the shape of a hemisphere, the stack would have a radius and height of some 18.3 feet. The mound of charcoal produced by such a pit would be 3483 cubic feet in volume, having a radius and height of 11.8 feet. Based on these figures, almost 430 charcoal production pits would have to be created in the Eureka area to supply one year's worth of charcoal for the smelters.

Research questions relating to charcoal production in the project area include:

1. Does the archaeological record provide verification of the historically documented production process described above?
2. Is there evidence of a collier(s) residing at each pit location? If not, is there evidence of a networking system whereby colliers worked out of a base camp? Reference is made in historic documents to 'charcoal ranches'. Are these the semi-permanent base camps?
3. Historic evidence suggests that kilns were used only for the reduction of juniper. Is there evidence of such a technology in the Mt. Hope area? If so, does it

appear to be coincident with or later in time than pinyon use?

Organization of the Production Industry

An important consideration is the organization of the charcoal production business. Three separate parties were necessary to the industry: the producers (the Carbonari), the consumers (the smelters), and the freighter. The freighter worked directly for the smelters on a contract basis. There is, however, some ambiguity about the relationship between the freighters and the Carbonari.

It is uncertain whether the Carbonari worked as employees of the freighters or as subcontractors. Statements made at the time lend support to the notion that the Carbonari worked for the teamsters, and that the teamsters owned the charcoal even when it was still in the pit. During the famous Fish Creek incident of the Coal Burners War of 1879, a petition was sent to the Governor of Nevada which included the statement that "They [Carbonari] now hold forcible possession of many charcoal pits in this county. By force they have prevented, and are now preventing, the owners of charcoal from hauling it to the furnaces... (Murbarger 1965:58)". Another reference from the same period also illustrates this point: "Marshall Rich, who had brought along several wagons, told the owners [the teamsters] of the charcoal to go ahead and begin loading, but the Italians [Carbonari] prevented them from doing so (Earl 1969:71)". The Nevada State Minerologists report for 1878 states that all of the charcoal burners in the region worked for "less than a dozen companies" (Nevada State Legislature 1879:27).

Typically, the freighter came to the production site, loaded the charcoal in bulk or in gunny sacks, delivered it to the smelter, and was paid. Only then did he return and pay the Carbonari for his efforts. From the early 1870s through the 1880s, the price paid for charcoal varied, but 26 cents per bushel upon delivery to the smelter seems to have been an average figure. Prices paid to the Carbonari seem to have been about 13 cents per bushel (Earl 1969:52), which the Carbonari complained was their actual production cost.

The interdigitation of charcoal transportation by mule team and the Eureka and Palisade Railroad is of interest. Bowers and

Muessig (1982:42) state that during 1880, the Eureka and Palisade Railroad hauled 6000 tons of coal and 8600 tons of lumber into Eureka, accounting for some two-thirds of all incoming freight. Charcoal transport by rail required established access routes between production sites and a railroad loading site. This suggests that only those areas along either side of the rail line could have been so served. Use of the railroad would have required that the charcoal be handled an additional time, increasing the per unit cost. During the troubled days of the Charcoal Burner's War of 1879, smelter operators investigated means of reducing charcoal transportation costs. They considered a greater dependence on rail transport, but dismissed the option as impractical (Grazeola 1969).

Research questions dealing with charcoal transport are few since little evidence of it is expected to be present in the archaeological record:

1. Is there evidence along the Eureka and Palisade Railroad suggesting that charcoal produced in the Mt. Hope area was transported by rail?
2. Is evidence of the mule-team wagons present at charcoal production sites?

Environmental Parameters of Charcoal Production

Other relevant questions include whether there are environmental parameters associated with the location of Carbonari sites? Is there a distributional pattern to the sites? Changes in the distribution of pinyon-juniper woodland in central Nevada during historic times are also a matter of research interest. As Thomas notes (1983:158-159), there is something of a controversy over whether subsequent reforestation has exceeded the original bounds of the pinyon-juniper woodland. The Mt. Hope area was no exception to the historic pattern of pinyon-juniper woodland exploitation. Axe and saw-cut stumps are ready indicators of the deforestation that took place here during the 1870s and 1880s. Observations made during our survey of the Mt. Hope area could be somewhat relevant to the issue of reforestation.

1. Using archaeological data (the size, number, and location of pits) and historical data (charcoal yield per cord of wood), is it possible to estimate the

coverage density of the woodlands present in the project area as of the 1870's?

2. Are there significant differences between the present and past distribution of pinyon woodlands? Are there old stumps where there are no standing trees? Are there trees where there are no stumps?

Ethnic Populations

Hardesty (1982:214) has identified ethnicity as an important historic research topic in central Nevada. Whether specific ethnic populations participated in the development of the Mt. Hope area is especially pertinent.

The Italians

Historic records indicate that a majority of the charcoal production in the Eureka area was an occupation identified specifically with Italians from northern Italy (Reichman 1967:46) and from the southern provinces of Switzerland. The 1880 census of Eureka County indicates that of the 840 Italians present, 594 (70.7%) listed their occupation as charcoal burners (Department of the Interior 1880). Shepperson (1970:121) states that by the end of the 1870s, charcoal production had become "almost exclusively an Italian function."

This occupation had a long history in Europe, one which grew dramatically with the Industrial Revolution. Charcoal burners became something of a political force during the late 1700s and early 1800s when they formed a secret revolutionary society known as the Carbonari. The society became a center for opposition to Napoleon and in the development of Italian nationalism: "[it] caught the imagination of the Italian people who thereafter associated ideas of independence, unity, and liberty with Carbonarism (Earl 1969:54)".

Italian charcoal producers present in the Eureka area during the 1870s identified themselves with the Old Country movement, and they frequently were referred to as Carbonari. The Italian Carbonari in Eureka, however, existed in a much different world. Thompson and West (1881:438) include a citation from the Carson City *Appeal* of August 21, 1879 that indicates the difficult position in which Carbonari found themselves:

> They [the coal burners] furnish coal to contractors, who deliver it at the furnaces from their own teams, and insist that the burners shall take their returns without being furnished with certified measurements for the receivers. It is easily seen how great wrong can be done through the collusion of dishonest parties.

As Earl (1969:57) points out, "the collusion of the teamsters, smelter operators, and merchants [against the Carbonari] was obvious." That being the case, why didn't the Carbonari leave? The answer is largely economic: measures were taken to ensure that they stayed in debt. Principal elements of the collusion were five-fold:

1. Carbonari wages were only sufficient to cover costs of production.
2. Frequently, teamsters would not show the Carbonari smelter receipts which indicated how many bushels had been delivered. The teamster easily could maximize his profit by underpaying the Carbonari;
3. A common practice of the day was to pay Carbonari not in cash, but in credits at selected local stores in Eureka (Earl 1969:56). A frequent complaint of the Carbonari was that when these credits were presented to the merchants, they were charged higher prices than the ordinary customer (Earl 1969:58).
4. Earl (1969:60) ponders the possibility that smelter operators were receiving kickbacks from teamsters in order to maintain their exclusive middleman role.
5. Grazeola (1969:34) indicates that the Carbonari did not make any attempt to forecast the need for charcoal. They produced as much as raw material availability permitted. This frequently resulted in a glutted market, having the effect of keeping prices low.

In addition, Eureka was known as an area where numerous Italians resided. As a result, there was a steady stream of Italian immigrants arriving in Eureka in search of work (Reichman 1967:47), thus keeping the labor supply high and wages low.

The first Italian and Swiss Carbonari may have been brought into the Eureka area by mining companies or teamsters under the Contract Labor Law (Reichman 1967:46; Grazeola 1969:16; Earl 1969:55). Grazeola (1969:14) suggests that Italian merchants in Eureka may have been middleman in such arrangements. The

immigrant would work for the middleman at a prearranged wage for up to seven years. Under this system, the salary due the immigrant was paid to the middleman and any overage between it and his prearranged wage was kept by the middleman. It is possible that the policy of paying in credits at local stores may have started when many Carbonari were under such obligtions.

In 1879 the situation came to a head. The Carbonari banded together, formed the Eureka Coalburners Protective Association, and prepared a list of demands. Foremost among them was an increase in the price paid for producing charcoal, from 25 to 30 cents per bushel. Other demands included that they be paid in cash and that the teamsters provide them with receipts showing how many bushels of charcoal had been sold. They threatened to cut off supplies unless their demands were met.

All through July of 1879, the local newspapers were full of rhetoric and allegations of misconduct from both sides. Beginning in August, Carbonari began to intervene by not allowing teamsters to load charcoal in the general Eureka area. Tensions grew, arrests were made, and it was only a matter of time before some form of hostilities broke out. On August 18, 1879, a group of armed teamsters (accompanied by a number of Eureka County Deputy Sheriffs) attempted to load charcoal at a charcoal ranch along Fish Creek south of Eureka. Accounts of what then occurred vary (see Grazeola 1969; Earl 1969), but the result was that shots were fired and five Carbonari died.

The shock of this event and the tone of the subsequent coroner's inquest and other legal proceedings made a strong impression on the Carbonari. Although pockets of resistence continued into September, most Carbonari again became active suppliers of charcoal. Were any of their demands met? Given that the original conspirators were the victors of the 'war', one wonders. In this light, Earl's (1969:82) comment that charcoal prices soon dropped to 22 cents per bushel is of interest.

Research questions relevant to the study area relating to the Italian population include:

1. Is it possible through an examination of the archaeological record preserved at charcoal production sites to verify that they were occupied by Italians?
2. Is it possible to identify an Italian artifact pattern

that is distinct from other similarly defined patterns in the project area or the surrounding region?

3. Is evidence present that will allow us to more fully characterize Carbonari lifeways?
4. Is evidence present which suggests that the project area played a part in the Charcoal Burner's War of 1879?

The Chinese

The Class II survey discovered artifacts of Chinese origin at a site (Eu790) situated near the Eureka and Palisade Railroad. Historic documents demonstrate that Chinese laborers were involved in the construction of the railroad. Thompson and West (1881:437) indicate that on December 15, 1976 an anti-Chinese demonstration took place in Eureka and that "a number of Chinese were driven from their work on the railroad." Further evidence of a Chinese presence is provided by Bowers and Muessig (1982:64) who report that groups of Chinese laborers lived at many of the line camps located along the Eureka and Palisade Railroad through the 1870s and 1880s.

According to the 1880 census, there were 623 Chinese in Eureka County (574 males and 49 females). Compared to a population of 6,021 Whites (4634 males and 1387 females) (Department of the Interior 1880). The average age of the Chinese was higher than for the White population, a function of the total absence of Chinese children in the county. The disparity between the sexes resulted in the almost total absence of legitimate conjugal Chinese families (Carter 1975:74). These observations indicate that any Chinese sites found in the project area were undoubtedly occupied only by men.

Difficulties between ethnic populations are recorded for the Eureka area. In the spring of 1872, the Eureka Consolidated Mining Company entered into a contract with A. E. Davis, a rancher located near Garden Pass, to supply three million bushels of charcoal. Davis hoped to reduce charcoal production costs through the employment of Chinese woodcutters (Shepperson 1970:122). The level of antagonism generated by Italian Carbonari was so high, however, that he ultimately broke his contract (Reichman 1967:45).

Research questions relevant to the Chinese presence in the

project area include:

1. Was the Chinese occupation of the area only transitory, associated with construction of the Eureka and Palisade Railroad?
2. Is there evidence of a Chinese presence at either of the two railroad stations located in the project area?
3. Is there any evidence in the project area of Chinese participation in the charcoal production industry?
4. Aside from the presence of Chinese ceramics, is there a distinctive Chinese artifact pattern that differs from others identified in the project area or the surrounding region?

RESEARCH METHODS

FIELD METHODS

A literature search and National Register of Historic Places review for the Mt. Hope vicinity was conducted prior to the Class II survey (James and Elston 1983:51, and Tables 2-4). No research work has been undertaken in the area since compilation of this information, eliminating any necessity for additional archival research prior to the Class III survey effort.

The field methods employed during this phase were in keeping with those used during the earlier Class II survey (James and Elston 1983). The prime objective of the Class III survey was to identify as many prehistoric and historic sites in the project area as possible. Survey activities were carried out by a field crew of six archaeologists divided into two teams of three; one supervised by the Project Archaeologist, the other by a Field Crew Chief. Survey activities were conducted using parallel transects spaced 30 m apart. Transects were oriented according to topographic features (drainages) or to historic features (road, railroad, etc.). Figure 4 provides a description of the areas surveyed.

Site Recording

When a prehistoric or historic site, isolated artifact, or feature was encountered, its location was plotted on the appropriate 15 minute USGS map. An intensive search was made of the immediate area in order to identify horizontal boundaries, content, and character of the site. Special attention was paid to the location of diagnostic artifacts that would allow the site to be placed into a temporal perspective. Each site was recorded according to BLM (1982) guidelines, using IMACS site forms. A datum was established and sketch maps drawn of the larger sites. All photographic information was recorded on standard photo logs. Isolated artifacts and features were recorded on standard IMR isolate summary sheets.

A consecutively assigned, temporary field number was issued to each site and isolate at the time of its discovery. Once out of the field, permanent trinomial site numbers were obtained from the Nevada State Museum; these are used throughout the text of this report.

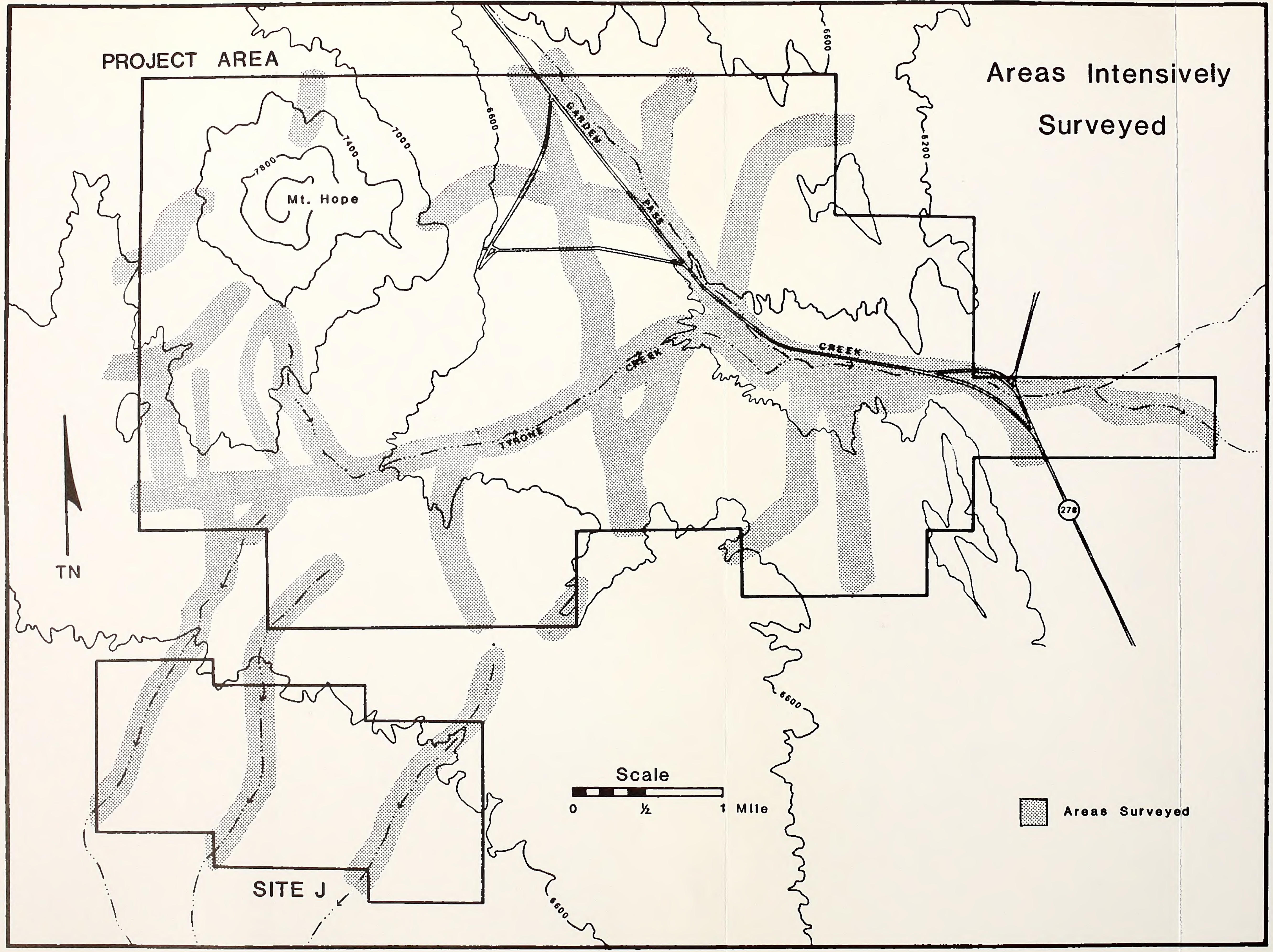

PROJECT AREA
Areas Intensively Surveyed
Mt. Hope
7800
7400
7000
6600
6600
6200
GARDEN PARK
CREEK
TYRONE CREEK
CREEK
278
TN
Scale
0
½
1 Mile
▨ Areas Surveyed
SITE J
6600
6600

Figure 4. Areas Surveyed.

All site assessments are based on surface indications; no subsurface testing was conducted during this phase of the project. The only time we used a shovel was to dig our truck out of Tyrone Creek.

Collections

The collection of artifacts was kept to a minimum: diagnostic isolates from prehistoric sites were collected at the discretion of the Supervisors, as were very small sites (fewer than 20 items) if they contained artifacts diagnostic of specific time periods. Diagnostic artifacts not collected were sketched. Diagnostic historic period isolates were collected if they were complete, in good condition, and unique or representative of a type. Collected items were bagged in the field and a provenience tag with all pertinent information was completed at the time of collection.

LABORATORY METHODS

Artifacts collected in the field were returned to the IMR laboratory where they were cleaned. Artifacts were then examined and all metric and descriptive data entered on standard IMR catalog forms. A copy of this catalog will accompany the collection to the curatorial facility. Each diagnostic artifact was assigned a unique specimen number which was applied to the artifact with permanent black or white ink sealed with clear lacquer. The trinomial site number was also written on each such artifact. Redundant artifacts, such as debitage, were sorted into general types and cataloged in lots. Each lot was assigned a unique specimen number. Specimen numbers, additional descriptive information, and permanent site numbers were added to the provenience tags.

Information regarding each site recorded during both the Class II and Class III phases of the project was entered into a computer file for further analysis. This file was created via the FMS-80 software program. Analyses were performed using the SP-Micro statistical analysis software program. Permanent copies of these are stored on 5-1/4" diskettes at IMR.

ANALYTIC METHODS

Artifact Type Designation

Projectile points were typed according to Thomas' (1981) central Great Basin key. Sites were placed into the chronological sequence for the central Great Basin. Bifaces were examined utilizing the stage form analysis originally presented by Muto (1971) and refined by Elston et al. (1977) and Elston, Hardesty, and Clerico (1981). Drills and other classes of specialized bifacial tools were analyzed individually. Pottery found during the survey was typed based on descriptions of styles presented in Beck (1981), Coale (1963), Madsen (1977), and Tuohy (1956).

To the extent possible, historic artifacts were described and dated in the field. Laboratory activities focused on the dating of artifacts and the assignment of their probable function (cf. South 1977). Collected artifacts with patents, makers marks, or trade names were researched to provide temporal definition of sites.

Determination of Site Type

Discussions in the research design rely heavily on a theoretically derived set of prehistoric site types (cf. Binford 1980). The application of these types with regard to the Class II and Class III site data provided basic data used in our discussions of subsistence and settlement patterning. In operationalizing site types, our primary emphasis was on the identification of functional classes of tools present. Several other means of classifying sites were reviewed in order to test the efficacy of our functional assignments. These include site size, the variety of lithic types present in the debitage and tool assemblages from a site, and tool to debitage ratios.

Functional Site Type Classification

In assessing historic !Kung Bushman camps in Africa, Yellen draws several conclusions regarding the use of manufacturing and functional variables in the designation of site type:

> The smaller a camp and the briefer its occupation, the more greatly it will differ from its immediate neighbors

> in terms of similarity of remains. The divergence will be most marked and most difficult to understand when byproducts of manufacturing activities are compared... (Yellen 1977:81).

He adds that

> At camps occupied for only a brief period of time, the range of subsistence activities represented are likely to be typical for a camp located at that specific area during that particular season. Thus, intercamp comparisons are likely to yield valid information about how particular areas are used, and differences...are likely to reflect culturally and environmentally significant facts.
>
> For manufcturing activities, however, this relationship will not hold. The smaller a site and the briefer its occupation, the more difficult it will be to predict what, if any, manufacturing activities took place. Comparisons among camps will likely give misleading results (Yellen 1977:82).

Consequently, functional categories of tools present at a site provide a less biased indication of subsistence activities that took place.

Holmer and Janetski (1980) have developed a site classification key that depends, in large part, on the number of functionally distinct tool types present at a site. While we agree that the use of a specifically defined key is a meaningful way to approach site classification, we feel that their 'functional classes' are not appropriate to the task. It is not only the number but the combination of functional classes present that should determine site type. Certain classes of artifacts are functionally more independent of one another. When several such classes are present at a site, then distinct activities are truly reflected. Other classes exhibit a higher degree of functional dependence and their co-occurrence does not necessarily demonstrate multiple activities.

Thomas (1983:72-73) presents a series of functional tool classes which provide a more meaningful basis for a functional site type key. A modified version of these classes is used in our refinement of the Holmer and Janetski key. The modified categories are listed below along with examples that one might expect to find in the project area.

1. RESIDENTIAL EQUIPMENT: shelters, hearths, fire cracked rock, firemaking equipment, woodworking tools (axes and adzes).
2. FOOD PROCESSING EQUIPMENT: milling equipment, cooking equipment (ceramics, basketry), eating utensils, storage facilities.
3. FABRICATING OR PROCESSING TOOLS (tools used to make other artifacts): flakers, hammerstones, drills, awls, gravers, cores.
4. FOOD ACQUISITION TOOLS: projectile points, fish hooks, nets, snares, and traps; and harvesting equipment such as pinyon hooks, trays, burden baskets, and grass cutting knives.
5. GENERAL UTILITY TOOLS: includes tools that were probably curated such as knives (harvesting, food processing, fabrication) and scrapers (food processing, fabrication); and ad hoc tools which were probably not curated, such as utilized and modified flakes (harvesting, food processing, fabrication), choppers (food processing, fabrication).

Thomas listed additional categories such as ceremonial and recreational equipment. These are seldom observed during surface survey, however, and so were not operationalized.

Elston (1979) presents information on the functional composition of site assemblages that hints at what we can expect. Working at a number of sites between Stead, Nevada and Hallelujah Junction, California, Elston (1979:330) classified the sites as to type and then examined each type separately. This revealed that winter villages (residential base camps) contain more funtional categories of artifacts than either summer camps (field camps) or hunting sites (locations). His data suggest that while there is a consistency in the functional categories present at the winter camps while summer camps are marked by a high degree of intersite variability both in functional classes present and in their relative abundance. Hunting sites, on the other hand, exhibit a certain regularity in the classes present and their frequency. These site assemblages are dominated (over 50%) by ad hoc, general purpose tools (utilized and modified flakes); the remainder is made up of projectile points and possibly curated general purpose tools (bifaces and scrapers).

The site type key we have employed is presented in Figure 5. The key is built around the structured and ordered appearance of each functional class of tools; the classes are listed in their assumed order of importance. In other words, there is an explicit pecking order with regard to the relative importance of each category. Importance is defined as the value of the category in identifying base camps.

Site Size

Ethnoarchaeological work among hunter-gatherers suggests that site size is at least partially dependent on length of occupation; the longer the occupation, the bigger the site. This may be of relevance in differentiating between smaller base camps and larger field camps. Steward (1941:234) and Thomas (1983:76) suggest that the shorter the term of occupation, the greater the likelihood that structures will be arranged in a close order. Long-term camps, on the other hand, are arranged in a more random fashion, with structures more widely spaced. Ethnographic descriptions of a "village site" indicate a generalized location, a place where family residences were scattered along a ridge or throughout a hilly woodland area (Thomas 1983:31). O'Connell (1977:125) demonstrates that length of residence in a site area can have a pronounced effect on overall site size due to changes in intrasite organization. Several factors may cause inhabitants to shift the physical location of a household within a site. Factors identified by O'Connell include the death of an inhabitant, changes in overall site population, conflicting social obligations, domestic strife, the accumulation of refuse, deterioration of the shelter, and even the weather.

Observations by O'Connell in the settlement at Bendaijerum in Central Australia showed that an average household made four intrasite locational changes over a nine-month period. The effect of this was to nearly double the archaeologically defined size of the site. Such sites should exhibit variability in artifact density with multiple differentiated "hotspots," while overall site size may serve as a means of differentiating between long and short term sites.

Thus, residential base camps should be, on the average, larger than field camps. Similarly, field camps should be larger than locations. To operationalize these assumptions, we calculated site area using site dimensions recorded in the field.

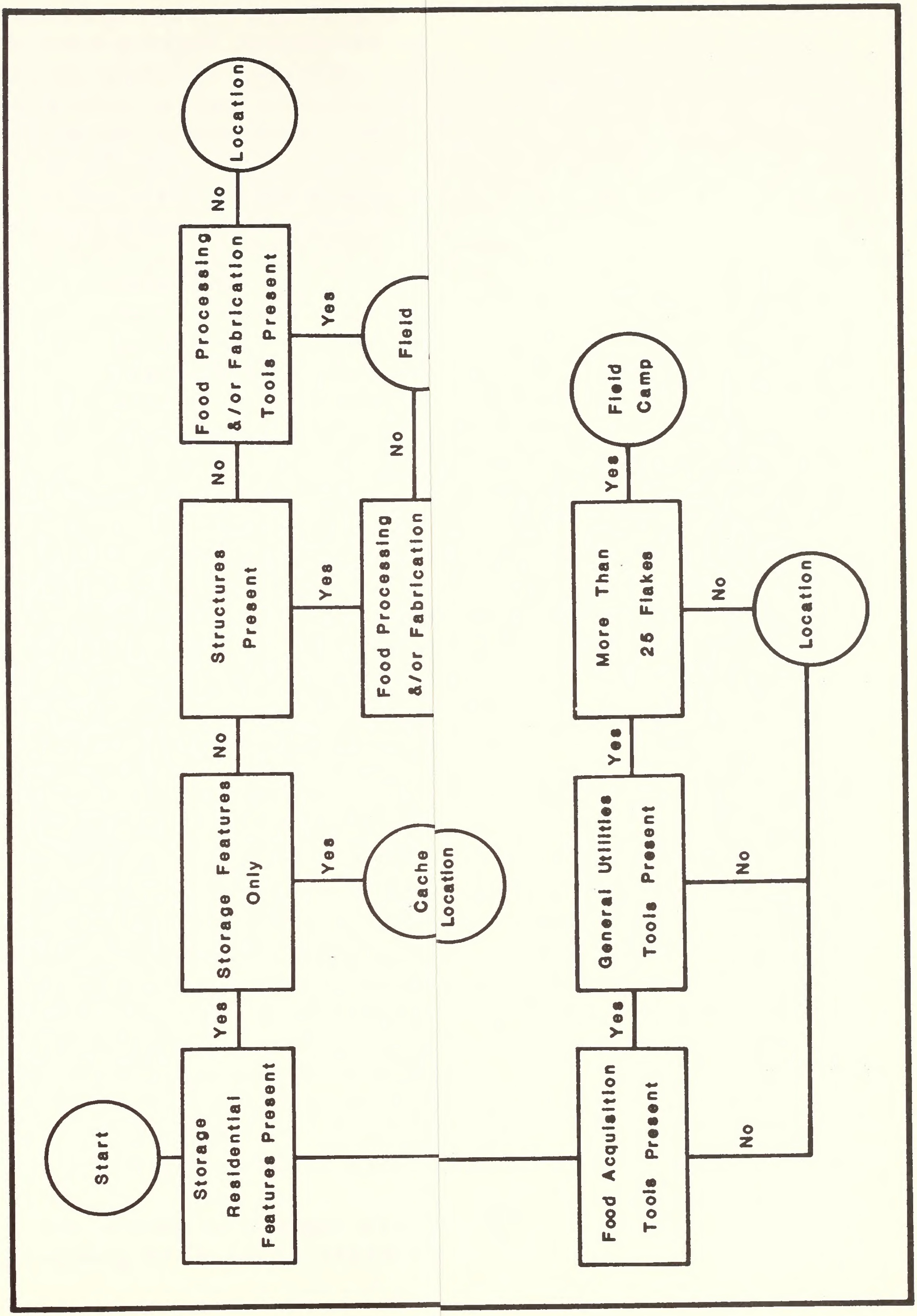

Start
Storage Residential Features Present
Yes
Storage Features Only
Yes
Cache Location
No
Structures Present
Yes
Food Processing &/or Fabrication
No
Field
Yes
No
Food Processing &/or Fabrication Tools Present
No
Location
Food Acquisition Tools Present
Yes
General Utilities Tools Present
Yes
More Than 25 Flakes
Yes
Field Camp
No
Location
No
No

Figure 5. Site Type Key.

Data from all the sites were arrayed to see if they cluster into distinct groups. The data for each functionally defined site type were arrayed separately to determine size similarities. We considered this one way of determining which sites are palimsests, sites which consist of temporally distinct, but overlapping, components.

Given previous work in the project area, we anticipated that site type sizes would conform to the pattern below.

Site Type	Area
Location	500, or fewer, square meters
Field Camp	500 to 5000 square meters
Base Camp	5000, or more square meters

Lithic Assemblage Variability

While conducting ethnoarchaeological studies, Gould (1980:126) observed that site types differ with regard to the number of lithic types present in the debitage and tool assemblages. He states that quantities of the two should be highest at base camps. In addition, the lithic materials represented in the tools should be very similar to those present in the debitage. Field camps, on the other hand, will exhibit a more limited range of material variation in both assemblages. The similarity in lithic types represented in tools and debitage will not be as high at field camps as at base camps.

Local applicability of these assumptions was demonstrated by Elston (1979:329) at sites located in the Hallelujah Junction area of northwestern Nevada. Winter villages (residential base camps) had a greater number of lithic materials present in the debitage and tool assemblages, and there was a fair degree of comparability between sites with regard to the types of materials present and their relative abundance. Summer camps (field camps) and hunting sites (locations) exhibited a different pattern: one or two lithic material types are predominant and there is little intersite comparability; each site exhibits a different pattern.

We measured lithic diversity by counting the number of distinctly different lithic materials present at each site. A

similar measure can be used to determine the variability present in the tool assemblage.

Tool to Debitage Ratios

We calculated tool to debitage ratios with the premise in mind that base camps should exhibit a narrow range of ratio values while field camps would have extreme ratios, either very high or very low. The tool count was based on all tools observed and recorded at each site. If the actual debitage count for a site was not recorded, we used the mid-point of the estimated debitage quantity as noted in Item 9, Part B on the IMACS site form. Once the ratios were calculated, values were arrayed and cross-tabulated with the results of other analyses.

Determination of Subsistence/Settlement Pattern Type

In our presentation of research concerns, three alternate subsistence and settlement strategies were discussed that may be relevant to the Mt. Hope area. Each strategy has implications with regard to the types and number of sites that would be present in the project locale. We listed the expectations specific to each strategy and, once site type designations were made, compared the data against our expectations.

Strategy 1: High Residential Mobility

This strategy is based largely on expectations of what a forager subsistence and settlement pattern should be like in the woodland areas of central Nevada. Thomas (1983) uses the Kawich Mountain Shoshone strategy as an example. The settlement pattern is made up of several sites that have fairly distinct archaeological assemblages, suggesting that each site was occupied for the performance of a specific procurement task. Such a system assumes a great deal of residential mobility. These are specific site expectations for Strategy 1:

1. base camps associated with primary water sources;
2. since highly mobile groups rarely develop logistic zones, field camps should not be present;
3. locations, the most predominant site type, should be scattered more or less evenly across the area;
4. sites within each type should exhibit some degree of patterned differentiation, reflecting functionally

specific activities;

5. there should be few storage-related sites and features; and,
6. given the assumed high emphasis on mobility, special purpose sites involving a high labor cost (hunting blinds) should be uncommon.

Strategy 2: Resource Exploitations Within the Foraging Radius

If operative in the project area, the second strategy could have been employed by either forager or collecter subsistence and settlement systems. In either case, a large base camp is located somewhere close to Mt. Hope and within the six mile foraging radius of the group occupying that camp. Likely candidate areas for the camp include Stinking Spring to the southeast, McBrides Spring to the northeast, Mt. Hope Spring to the north, or the area around Roberts Creek ranch to the west. The closest spring in Diamond Valley is Sulpher Spring, located some eight air miles from the center of the project area. These are specific site expectations for Strategy 2:

1. virtually all sites should be related directly to resource acquisition; ie., there should be many locations;
2. no base camps should be present and field camps are unlikely; and,
3. if the area was used by collectors, caches may be present, but absent if foragers were using the area.

Strategy 3: Resource Exploitation Within the Logistical Radius

As previously stated, the subsistence and settlement patterns of foragers seldom result in the development of a logistical radius. Therefore, we can safely assume that only a logistically organized group would operate in the project area using a strategy that emphasizes exploitation within this radius. The possibility that a collector strategy was used in the project area has distinct implications on what we should see archaeologically. Artifact assemblages at sites would probably indicate several distinct functional activities. Many sites would have seen a relatively long period of occupation and others would have been serially occupied for different functional reasons. We held these specific expectations for Strategy 3 sites:

1. if the project area is within a logistical radius, then the base camp would be located anywhere from 10 to 20 miles away so that base camps should not be present in the project area;
2. field camps will be present;
3. field camps may exhibit a significant degree of intersite variability with regard to function(s);
4. locations will be abundant and may also exhibit intersite variability; and,
5. depending on the nature of the resources being sought, caches and special purpose sites (hunting blinds) may be present.

National Register Evaluation Methods

The National Register of Historic Places was developed by the Department of the Interior to serve as a means of isolating properties worthy of management consideration. In order for a property to be eligible for nomination to the Register, it must possess a certain degree of integrity and satisfy at least one of four standards of significance (36 CFR Part 60.6). The National Park Service has published draft guidelines entitled "How to Apply the National Register Criteria for Evaluation" (NPS 1982).

To possess integrity a property must retain sufficient physical character to convey an association with past patterns, persons, designs, technology, or events (NPS 1982:44). Although designed primarily for use in the evaluation of standing structures, the National Park Service evaluation standards are marginally applicable to archaeological resources of the prehistoric and historic periods. There are seven components of integrity:

1. Integrity of Location: Is the site physically in the same place as when first created via human action? (Have the contents of the site been redeposited by stream action?)
2. Integrity of Setting: Is the relationship between the site and its physical surroundings the same as when it was occupied? (Have subsequent events altered the surroundings so as to reduce the integrity of setting?)
3. Integrity of Design: Is there a pattern inherent within the site that reflects an "organization of

space, proportion, scale, technology and ornament" (NPS 1982:35)? (Have human or natural processess altered designs that once may have been present?)

4. Integrity of Material: Is the material present at the site the same as that present when the site was occupied? (Have intrusive materials been introduced which serve to reduce the integrity of material?)
5. Integrity of Workmanship: Are the levels of skill and technology employed at the site during its occupation readily observable? (Have human or natural actions altered the material present in such a manner as to decrease our ability to perceive workmanship?)
6. Integrity of Feeling: Does the site and its surroundings convey a sense of place and time appropriate to the period of occupancy?
7. Integrity of Association: Does the site enjoy a strong link with the people, events, or time it represents?

The four standards of significance incorporated in the Register are listed in 36 CFR Part 60.6. The vagueness of these standards, however, often results in their inconsistent application. Further, they force a black-and-white dichotomy between significant and non-significant resources. Therefore, we have employed a series of measuring criteria, derived largely from Glassow (1977), that reflect the specific nature and range of the resources evaluated:

1. Variety: How many different types of information are present at the site?
2. Quantity: How much information is present at the site?
3. Separability: Is the information present easily removed from the site without a substantial loss?
4. Research Potential: Are the data present of value in addressing data gaps, research goals, or methodological problems identified in appropriate regional research designs?
5. Interpretation Potential: Does the site exhibit clearly discernible qualities which lend themselves readily to public interpretation?
6. Public Concern: Have local or ethnic groups expressed an interest in seeing that the site is protected or developed?

It should be noted that all statements regarding site National Register eligibility are based on observations that focus on surface manifestations at each site. No subsurface testing has been undertaken in the Mt. Hope project area to date.

CURATION

The artifact collection generated by this project will be curated at the Department of Anthropology Museum, University of Nevada, Reno. Copies of the artifact catalog and other project documentation will accompany the collection.

ARTIFACT DESCRIPTIONS

Diagnostic prehistoric and historic artifacts were collected from 33 sites and isolated locations in the project area during the Class III survey. Three small sites (Eu960, 989, and 1009) with diagnostics were collected in their entirety in accordance with BLM guidelines (BLM 1982). This chapter presents descriptions of all collected artifacts. A summary list of collected materials is given in Table 4 at the end of the chapter.

PREHISTORIC ARTIFACTS

Projectile Points.

Twenty-seven projectile points and point fragments were collected: 23 were complete enough to classify using the recent revision of a key used to type projectile points in the central and western Great Basin (Thomas 1981). Point attributes are given in Table 5; illustrations appear in Figures 6, 7, 8, and 9, all of which appear at the end of this chapter. An additional 15 uncollected points were typed from field drawings; they are described along with the collected points. Of the 42 points described, 39 (92.9%) were fashioned from chert; two are basalt, the other is quartzite.

Stemmed Points

A collected brown chert artifact (Catalog Eu930-1) appears to be the haft element of a stemmed point (Figure 6a). This item is a terminal and midsection fragment which constricts just below the break. It is secondarily thinned, with tertiary flake scars on the lateral edges, dorsal surface only. It is thick and lenticular in cross section.

Large Side-notched points

Two Large Side-notched points were collected and one was assigned to this type based on a field drawing. The first point (Catalog Eu960-1) was finely flaked from dark purplish chert and has a broken tip. The large rectangular base has cortex (or an original weathered surface) present on both surfaces. The second point (Catalog Eu1053-1) is light grey chert; it has a large rectangular base which is broken at the extreme proximal end, as

is the tip. The uncollected point (Site Eu1011, spec. a) is pure white chert. It is shaped like an isoceles triangle and has a large rectangular base which is notched at the bottom.

These points formerly might have been designated Northern, Elko, or Rose Spring Side-notched. Thomas (1981:30) has reconsidered these classifications and feels that "Both Elko and Rose Spring Side-notched categories should be dropped as there is no stratigraphic or morphological evidence to support their existence". Although the temporal span of these points is not well-documented at present, the Large Side-notched points in the Mt. Hope collection may be Middle Archaic dart points dating between 2000 B.C. and A.D. 500 (James and Elston 1983).

Humboldt Series

One Humboldt series projectile point was collected (Catalog Eu1030-1). This small pink chert artifact is missing its tip and one tang. The lateral edges are serrated (Figure 6b). Points of this series are dated from 3000 B.C. to A.D. 700.

Elko Series

Six Elko Corner-notched and one Elko Eared points were collected; five Elko Corner-notched and three Elko Eared points were typed from field drawings. Thomas (1981) dropped the Elko Side-notched designation and groups Elko Contracting Stem points into the Gatecliff series. Within the Elko series he discriminates between the Eared and Corner-notched varieties, indicating that this distinction is morphological and not temporal (Thomas 1981:21; also see James and Elston 1983). Thomas (1981) dates Elko Series points in the central Great Basin to between 1300 B.C. to A.D. 700.

One Elko Corner-notched point is a fragmentary base crudely made of grainy grey chert (Catalog Eu989-1). A second basal fragment is of glossy light tan chert which appears to have been thermally altered (Catalog Eu956-1). The third fragmentary base is made of milky white chert which shows the original flake surface on one side (Catalog Eu886-1). Yet another base made of mottled grey/white/red chert appears to be quite battered (Catalog Eu907-1). One of the more complete points is made of a greyish chert; only the tip and one shoulder are missing (Catalog

Eu1022-3). Another battered point is made of quartzite and has the tip, one shoulder and tang missing (Catalog Eu1053-2).

Elko Corner-notched points typed from field sketches include three bases, one of grey-cream chert (Site Eu1011, spec. b), one of basalt (Site 1012, spec. b), and one of grey chert (Site Eu1024, spec. a). Two nearly complete points were identified: a large milky white/gold chert point which has the tip missing (Site Eu1026, spec. b) and a battered pink chalcedony point missing the tip and one barb (Site Eu1057, spec. a).

One long, narrow basalt Elko Eared point (Figure 6c) was collected (Catalog Eu983-1). In addition, three points were typed as Elko Eared based on field sketches. These include a small white chert base fragment (Site Eu995, spec. a), a finely flaked grey chert point with one shoulder barb broken (Site Eu1023, spec. a), and a short, broad tan chert point which has a somewhat lopsided appearance (Site Eu1040, spec. c).

Gatecliff Series

Thomas (1981:22) includes Elko Contracting Stem and Pinto point types in his newly defined Gatecliff series dated from 3000 B.C. to 1300 B.C.

Three Gatecliff points were collected: the first (Figure 6d) is a large split stem base of pink chert with well defined barbs and tangs (Catalog Eu902-1); the second is also a split stem base (Catalog Eu1001-1) made of semi-opaque mottled milky beige chert and shows utilization along the left lateral edge on the dorsal surface. It also exhibits well defined tangs, although the shoulders are somewhat rounded. The third artifact (Figure 6e) is a finely flaked contracting stem point of grey chert with phenocryst inclusions (Catalog Eu1015-1).

One Gatecliff Split Stem point (Site Eu1040, spec. a) was identified from a field sketch. Made of white chert, the point has long tangs and broad shoulders; the tip is missing.

Rosegate Series

Nine points of this type were collected; three were identified from field sketches. The Rosegate point type is a combination of two previously recognized Great Basin types, Rose

Spring and Eastgate (cf. Thomas 1981:19). The rationale for the combination is that there is no known time range difference between the two types; the distinction appears to be purely morphological. The combination produces a temporally sensitive indicator diagnostic of the period A.D. 700 to A.D. 1300 (Thomas 1981; see also James and Elston 1983).

One small point (Figure 6f) of dull grey chert with rounded shoulders and base is complete (Catalog Eu1022-2). Three points are nearly complete; two are missing only their extreme tips. One is of grey-tan chert with chalcedony inclusions (Catalog Eu906-1); the other is a pinkish tan chert point which has tangs of different sizes, one apparently having been resharpened (Catalog Eu1054-2). The third nearly complete point is missing the tip and one barb (Catalog Eu911-1). It is made of grey chert and the original flake surface is visible on the ventral surface.

The remaining points are more fragmentary. One is a thin but wide point of red chert or jasper, missing the distal portion of the blade and one tang (Catalog Eu1011-1). The remaining tang is squared off. Another point fragment is missing the tip and part of the stem (Catalog Eu989-2). It is made of a grey-tan chert with dark stripes. A point of grey chert with phenocryst inclusions is somewhat battered and the tip, part of one side, and the tangs are missing (Catalog Eu1017-1). One basal fragment was also collected (Catalog Eu1022-1). It is made of grey chert with phenocryst inclusions. One very interesting point fragment made of black chert has a tip that has been resharpened and shaped as a graver point (Catalog Eu1041-1).

Three Rosegate Series points were identified from field sketches. One of these is complete (Site Eu1012, spec. a): it is made of chalcedony and has rounded shoulders and a small base. One small white chert point is nearly complete with only the tip missing (Site Eu1040, spec. b). The third is a small incomplete point with one barb and the tip missing (Site Eu1024, spec. a); it is made of grey chert.

Unclassified Fragments

Six unclassifiable point fragments were collected. These are a possible contracting stem base of mottled white/red/purple

chert (Catalog Eu950-1); a barb fragment made of apricot colored chert, probably from a Rosegate Series point, (Catalog Eu1013-3); a small unidentifiable fragment of grey chert (Catalog Eu919-1); a deep red or maroon chert piece which may have been the distal end of a projectile point (Catalog Eu1022-5); an apparent point midsection of grey chert with phenocryst inclusions (Catalog Eu1009-3); and an edge fragment from a point made of grey chert shot with white lines (Catalog Eu1009-4).

Bifaces

Four bifaces were collected during field work. Of these, one is a Stage I biface, one is a late Stage II biface, and two are Stage III bifaces. The Stage I biface (Catalog Eu1008-2) is a thick, roughly triangular, chunky piece of grey chert with cortex on at least one surface. Flake scars are broad and the artifact exhibits limited alteration. The Stage II biface reflects greater modification. In fact, it is smaller and more regular in outline than is usual for Stage II bifaces. It is made of grey chert with white chert and quartzite inclusions and a small amount of cortex is present on one surface (Catalog Eu1013-2). Stage III bifaces are characterized by controlled thinning and shaping, with the artifact approaching its final form. One of these is a white chert fragment, thin, with broad flake scars and secondary retouch along the edges (Catalog Eu1008-1). The other example is a large knife fragment of granular grey chert with large broad flake scars and some edge retouch (Catalog Eu1013-1).

Drill

Two incomplete drills were found during the survey. The first (Catalog Eu984-1) has a rounded base with a parallel-sided shaft and is truncated at the extreme distal end. It is made of grey chert mottled with darker grey spots (Figure 7a). The second drill, made of light pink/tan chert, is thick in cross-section and has a rounded base (Catalog Eu1009-1). The shaft is completely truncated but the base shows constriction near the break. This item shows thermal alteration in the form of potlidding, which appears to have occurred after production.

Scraper

One nearly complete end scraper (Figure 7b), made on a large flake of milky grey/tan/white chert banded with tan and brown, was collected (Catalog Eu1022-4). The scraper is teardrop shaped in plan view, and plano-convex in cross section. Only the extreme proximal end of the artifact is missing. While the dorsal surface exhibits very large flake scars, the scraper is modified only in discrete areas along the edges. It exhibits heavy use wear on the distal end, dorsal surface only.

Utilized and Modified Flake Tools

Four flake tools were identified among the collected artifacts. All are intact with the exception of one. The first item (Figure 7c) is a flake of red/gold mottled chert with the extreme distal end truncated (Catalog Eu986-1). Evidence of utilization and retouch is seen on the dorsal surface, with larger flake scars on the left than the right lateral edge. There are scars on the ventral surface, right lateral edge, also.

The second artifact is a nearly complete flake of grey chert with inclusions (Catalog Eu1022-6). The extreme distal and proximal ends have been truncated. It is modified on the right lateral edge, dorsal surface only.

The third tool (Figure 7d) is a large, thick flake of fine-grained basalt (Catalog Eu1043-1). It is irregularly shaped, somewhat plano-convex in cross section, and appears to be a distal fragment with only one lateral edge intact. This edge is modified on the dorsal surface only, at a very steep angle. The ventral surface has very little modification. This appears similar to early tools often found at pre-Archaic period sites.

The modified flake fragment is of white chert banded with tan stripes (Catalog Eu986-3). It is a midsection fragment with the left lateral edge modified on the ventral surface only. The right lateral edge is modified on both ventral and dorsal surfaces.

Debitage

Ten pieces of debitage were collected from five sites. One broken chert flake each was collected from Sites Eu960 (Catalog

Eu960-2) and Eu989 (Catalog Eu989-4). A single grey secondary biface reduction flake was recovered from Site Eu1008 (Catalog Eu1008-3). Site Eu1009 produced six flakes (Catalog Eu1009-5). One is a decortification flake and three are primary flakes, all of the same chert material. One is a biface reduction flake of white chert and another is a biface reduction flake of grey chert. The last debitage item is a large basalt flake recovered from Site Eu1043 (Catalog Eu1043-2), the site with the possible early man modified flake tool. This is a large biface reduction flake of a more grainy and coarse basalt than the modified flake tool.

Pottery

Nine fragments were collected from a total of about 50 sherds, which may represent a single Shoshone Brownware flat bottomed vessel. These are from Site Eu1054 (Catalog Eu1054-1). One is a rim sherd, three are body sherds, one is from the flat bottom of the article, and four are thick and uneven basal fragments from the edge where the side and the bottom of the vessel conjoin. These basal pieces are somewhat "L" shaped in cross section; the bottom portion is almost twice as thick as the wall. The single, flat, bottom fragment is also about twice as thick as the wall portions. The color of the outside of the sherds is buff - Munsell 10YR/5/2 - and this color penetrates only about 2.5mm into the body of the sherd. The core is black - Munsell 10YR/2/1 (Munsell 1975) - which indicates a low firing temperature and incomplete oxidation (Shepard 1976:216-7). Core texture is open and coarse and it appears that a well-sorted sand was used for temper. The temper is unevenly distributed within the material, probably resulting from limited wedging (Shepard 1976:156-9). The exterior surface texture is irregular and uneven, showing depressions and grooves, with non-plastic particles generally protruding. The vessle appears to have been made of a coarse, grainy paste which was then wiped, although the interior surface may have been scraped rather than wiped (Shepard 1976:188).

Shoshone Brownware fragments were observed at four other sites within the project area. Two sites are fairly close together, on either side of an ephemeral drainage flowing into Tyrone Creek. Over 35 fragments were found at the site on the west side of the drainage (Site Eu985). These fragments appeared burned on the inside and may have been rubbed with a greenish

material (ochre?) on the outside (a chartreuse color shows in the grain). The largest fragment, a wall sherd, is 13.6 x 9.5 cm wide and is 0.7 cm thick. The pottery appears to have been formed of coils. The large fragment is finger-smoothed in a horizontal direction on the inside and a vertical direction on the outside; the paste is coarse and grainy. The edges and the interior of the fragments have lichen growing on them. The site on the east side of the drainage (Eu986) contained at least 13 body fragments and 2 rimsherds. These fragments showed evidence of a sand/grit temper producing a coarse-grained paste. At site Eu1022, 12 body fragments were found in association with a large scatter. Site Eu1056 contained a single sherd of Shoshone Brownware.

HISTORIC ARTIFACTS

Nineteen historic artifacts were collected, either complete or in fragments, from eight sites. The artifacts are divided into groups according to presumed function (South 1977:95; Elston, Hardesty, and Zeier 1982). These groups include culinary, personal, heating and lighting, firearms, and miscellaneous. Artifacts are illustrated in Figure 9.

Culinary Items

Kitchenware

Artifacts in this class consist of ceramic fragments of four separate Chinese bowls. The first bowl (Figure 8a) is evidenced by six fragments of a thick-walled Celadon rice bowl (three rim sherds, two body fragments, and a complete base) which shows a seal mark under the glaze (Catalog Eu787-7). The second bowl is represented by a single Celadon rim sherd (Catalog Eu787-4). Two rim sherds (Figure 8b), one body sherd, and a base represent the remains of a Swatow rice bowl (Catalog Eu787-1). The base of this bowl does not have a seal mark but shows two faint blue rings around the inside of the bowl near the bottom, and the figure "3" on the inside floor of the bowl (Figure 8c). Two rim fragments of a second Swatow bowl were collected from a different location (Catalog Eu787-2).

All of these items were collected from locations in close proximity to the Eureka and Palisade Railroad bed and are recorded as part of that site. It is assumed that the major

influx of Chinese in this area began with railroad construction, which would date the first use of these utensils in the project area to 1875. This date would extend into the early 1880s if Chinese were employed at railroad depots or in mining activities after the line was in operation.

Food Containers

Included in this group of artifacts are three containers or fragments thereof: two were found close to the railroad bed and are recorded as part of that site (Eu787).

The first item consists of several fragments of clear or faintly amethyst glass found near the line of the Eureka and Palisade Railroad (Catalog Eu787-5). The base of a jar is embossed "Kerr Glass ..fg...Sand Springs.." around the edges, and "Pat Au 8 1915" appears in the center. Two pieces are wall fragments, one of which is embossed "..s,, (sic)", and the other embossed "..so..".

The second container is represented by two thin-walled fragments of ceramic with a thick dark brown (almost black) glaze on the outside (Catalog Eu787-3). The core of these fragments is a very white paste. Present on the interior surface is a thin tan glaze. These are probably fragments of a Chinese wine bottle of brown glazed stoneware, judging from the fineness of the paste and the thin walls. "The fabric of the thin walled vessels, such as the wine bottle, is finer and contains fewer inclusions than the thicker walled storage vessels" (Praetzellis and Praetzellis 1979:152). If these represent Chinese-used items, they would date to the same period as the Celadon and Swattow fragments mentioned above.

The third food container (Figure 9a) is a heavy amethyst glass jar with a metal push-on type lid (Catalog Eu1021-1). The lid is embossed "Pioneer Baking Powder Guaranteed Pure" around the outer edge, and in the center, "16 Ounces Net Weight." Archival research has failed to identify or date the brand and style.

Personal Items

Medicinal

One artifact was recovered that fits into this category (Catalog Eu998-1), an aqua blue glass fragment embossed "..XL Bitters". This is identified as a Dr. Henley's Wild Graperoot Bitters bottle. This particular bottle (with the "IXL" label) was produced in San Francisco between 1873 and the early 1890's, after which time the company went out of business (Elston, Hardesty and Zeier 1982:235).

Spirits

Included in this section are fragments of glass otherwise unidentifiable, but of colors or with stylistic features commonly associated with beverage bottles, as well as those items identified as to contents. There are five items or fragments thereof in this category.

Site Eu986 produced a base fragment of a green glass bottle with a pushup, or slight concavity, in the base (Catalog Eu986-1). This pushup feature was used during manufacture so that the bottle could withstand internal pressure produced by carbonated liquids (Berge 1980:40). Also collected from this site were five black glass fragments (Catalog Eu986-2). Black glass (usually found in beer, wine, or medicine bottles) was commonly manufactured prior to 1860 and found at sites occupied between 1860 and 1880 (Rock 1980:16). It should be noted that "black glass" is, in fact, so dark green as to appear black unless held up to strong light.

Another item collected is a brown, seamless bottle neck (Catalog Eu998-4) with a "brandy" neck finish (Berge 1980:57). It has an applied lip, a characteristic indicating post-1870 manufacture (Rock 1980:9).

The fourth item is four fragments of green glass, basal fragments showing a deep kickup of the type used for champagne bottles (Catalog Eu998-5). Some surfaces of these fragments show heavy mineralization.

The fifth item is a broken green champagne bottle with a deep kickup (Catalog Eu943-1). The bottle is seamless and the

lip was applied with a lipping tool. Seamless bottles date generally prior to 1860. However, the turn mold, commonly used between 1880 and 1900, also produced bottles which resembled free blown bottles and lacked seams. In this process, the mold was turned while the bottle remained inside (Berge 1980:75). A lipping tool was patented in 1856; its use was widespread between 1870-1920 (Rock 1980:9).

Tobacco

One item is included in this category. This is a fragment of a British-made clay pipe bowl (Figure 9b) imported between 1870 and 1910 (Catalog Eu1011-2). This item is 40.4mm long, 21.6mm wide, and 8.0mm thick. Both the inside and outside surfaces are curved. The exterior has striations which run lengthwise, while those inside the bowl run horizontal. The bowl material shows a blue-grey core. The bowl does not appear stained inside.

Opium

The single item in this classification is fragments of a thin-walled sheet brass opium tin (Catalog Eu998-2). The lid is embossed with untranslated Chinese characters (Figure 9c). As with the other Chinese artifacts described above, this item was probably used between 1875 and the early 1880s.

Heating and Lighting

One item was collected which appears to fit within the category of kerosene or lamp oil cans, a fragment of can top (Catalog Eu998-3). We presume that the can once held kerosene: present on the top are the remains of a lead seal at the circular opening. The opening is grooved at the outer edge; the center was evidently dug out to permit use of the contents.

Firearms

One brass shotgun casing was found (Catalog Eu1021-2). This was a center fire cartridge manufactured by Union Metallic Cartridge Co., Bridgeport, Conn. from 1867-1902 (Berge 1980:224).

Miscellaneous

Insulator

One item was found which appears to be an early insulator made of bakelite (Catalog Eu794-1). It is black, cylindrical (2-3/16" in overall length, with a shaft 1 7/16" long which is closed at one end and surmounted with a 5/8" band), and broken at its outside edge. It appears that beyond the break the shape flared out somewhat. The artifact has an outside diameter of 3/4" at the closed end and 1 3/16" at the open, broken end (Figure 9d). The insulator was found along the old Garden Pass Road in association with domestic historic debris. It is recorded as part of the Garden Pass Road Site (Eu794).

Rubber Gasket

This is a fragment of what apparently was a hard rubber gasket found along the line of the Eureka and Palisade Railroad (Catalog Eu787-6). It has a heavy deposit on all surfaces, is triangular and curved in overall outline, broken off at one end but ending in a point at the other. If associated with the railroad, this item would date between 1875 and 1938.

Table 4. List of Cultural Materials Collected.

Site No.	Projectile Points	Biface	Flake Tools	Drill	Debitage	Pottery	Historic	Entire Site Collected?
26EU787							6 frags. Swatow ceramic; 7 frags. Celadon ceramic; 2 frags. dk. brn. glaze ceramic; 3 frags. lt. amethyst glass; 1 frag. weathered rubber gasket	no
26Eu794							1 bakelite insulator fragment	no
26Eu886	1 Elko Corner-notched, white chert							yes isolate
26Eu902	1 Gatecliff Split Stem, pink chert							yes isolate
26Eu906	1 Rosegate white chert							yes isolate
26Eu907	1 Elko Corner-notched, grey-pink chert							yes isolate
26Eu911	1 Rosegate grey chert							yes isolate
26Eu919	1 unidentifiable frag. grey/white chert							yes isolate
26Eu930	1 haft element brown chert							yes isolate
26Eu943							1 green glass champagne bot.	yes isolate
26Eu956	1 Elko Corner-notched white chert							yes isolate
26Eu960	1 Large Side-notched purplish chert							yes

Table 4 (Continued).

Site No.	Projectile Points	Biface	Flake Tools	Drill	Debitage	Pottery	Historic	Entire Site Collected?
26Eu960 (cont'd)					1 chert flake,			yes
26Eu983	1 Elko Eared, basalt							no
26Eu984				Mottled grey chert, round base				no
26Eu950	1 unidentifiable fragment, mottled chert							yes isolate
26Eu986			1 red-orange chert modified flake				1 frag. green glass; 5 frags. black glass.	no
26Eu989	1 Elko Corner-notched, grey chert		1 brown banded wh. chert modified flake		1 brown/tan chert flake			yes
26Eu998							1 frag. aqua glass Dr. Henley's Wild Graperoot IXL Bitters bottle; 5 frags. brass opium box; 1 can frag. w/ lead seal; 1 frag. brown glass appl. lip bottle neck; 3 green glass bottle frags. w/ pushup.	no
26Eu1001	1 Gatecliff split stem, grey chert							no
26Eu1008		1 grey chert Stage I; 1 white chert Stage III			1 grey chert flk			no
26Eu1009	1 medial frag. unidentifiable white chert	2 grey chert Stage III fragments		1 white chert round base	6 misc. cherts flks			yes

Table 4 (Continued).

Site No.	Projectile Points	Biface	Flake Tools	Drill	Debitage	Pottery	Historic	Entire Site Collected?
26Eu1011	Rosegate, red chert						1 clay pipe bowl fragment	no
26Eu1013	1 unidentifiable apricot colored fragment	1 Stage III 1 Stage II, both grey chert						no
26Eu1015	1 Gatecliff Contracting Stem, grey chert							no
26Eu1017	1 Rosegate grey chert							no
26Eu1021							1 amethyst glass baking powder jar with metal embossed push-on lid; 1 brass 10 gauge shotgun casing	no
26Eu1022	2 Rosegate grey chert; 1 Elko Corner-notched, grey chert	1 Stage III red chert	1 end scraper made on a flake; 1 grey chert mod. 1 edge					no
26Eu1030	1 Humboldt, pink chert							no
26Eu1041	1 Rosegate, black chert							no
26Eu1043			1 uniface, modified basalt flake		1 basalt flake			yes
26Eu1053	1 Large Side-notched; 1 Elko Corner-notched; both grey chert							no
26Eu1054	1 Rosegate, tan chert					9 fragments Shoshone Brownware		no
Totals:	27 points & frags.	8 bifaces	5 flake tools	2 drills	10 pieces debitage	9 pieces		

Table 5. Projectile Point Attributes

Type	Site No.	Spec. No.	Material	Portion	LS	LT	LA	LM	WM	WB	TN	Wt.	Est. Wt.	NW	DSA	PSA	NOI	(BIR)	LT/WM	WB/WM	Max. Wpos.	Comments
ECN	26Eu386	1	Chert	Base	19.1	(36.8)	(36.8)	---	(22.8)	(14.4)	4.7	2.1	3.1	10.3	146	135	11	1.00	1.60	.63	---	
GSS	26EU902	1	Chert	Base	29.8	(57.0)	(53.8)	---	24.1	14.0	5.3	4.3	5.8	13.7	161	91	70	.94	2.36	.58	---	
RGS	26EU906	1	Chert	Complete	30.7	(36.2)	(36.2)	---	22.1	9.0	4.5	2.3	2.4	8.6	124	105	19	1.00	1.60	.40	---	Tip gone
ECN	26EU907	1	Chert	Base	21.8	(43.4)	(43.4)	---	(24.8)	(14.2)	5.3	3.1	4.8	13.0	137	103	34	1.00	1.75	.57	---	
RGS	26EU911	1	Chert	Complete	27.9	(34.6)	(33.4)	---	(18.6)	8.9	3.2	1.5	1.6	8.0	127	103	24	.96	1.86	.47	---	No tip, barb
Haft	26EU930	1	Chert	Haft	50.9	50.9	50.9	---	25.2	6.0	8.9	12.6	---	---	---	---	--	---	4.04	.24	---	Stem haft
ECN	26EU956	1	Chert	Base	32.5	(49.2)	(49.2)	---	(23.3)	15.5	4.1	2.7	3.5	10.6	144	121	23	1.00	2.10	.66	---	
LSN	26EU960	1	Chert	Tip gone	28.0	(33.2)	(33.2)	---	(16.9)	16.9	3.9	1.6	1.7	7.5	179	165	14	1.00	1.96	1.00	---	Battered
EE	26EU983	1	Basalt	Complete	53.0	53.0	49.3	---	14.8	12.4	6.7	4.0	4.0	8.9	207	144	103	.93	3.50	.83	---	Tip chipped
ECN	26EU989	1	Chert	Base	34.0	(48.4)	(47.8)	---	(27.0)	(19.0)	6.3	3.7	4.9	10.0	154	121	33	.98	1.79	.33	---	Battered
EE	*26EU995	NC	Chert	Base	22.2	(34.4)	(31.1)	---	20.6	(13.0)	---	---	---	10.9	161	148	13	.90	1.67	.63	---	Field sketch
GSS	26EU1001	1	Chert	Base	30.0	(39.9)	(36.6)	---	(23.8)	(11.5)	5.5	3.1	3.7	12.5	175	88	87	.92	1.68	.48	---	Battered
RGS	26EU1011	1	Jasper	Base	31.0	(45.4)	(45.4)	---	(25.9)	9.3	3.8	2.4	3.0	8.7	118	97	21	1.00	1.75	.35	---	Battered
LSN	*26EU1011	NC	Chert	Base	26.1	(39.3)	(34.9)	---	17.0	17.0	---	---	---	8.4	177	161	16	.89	2.31	1.00	---	Base notched
ECN	*26EU1011	NC	Chert	Base	24.2	(46.3)	(43.6)	---	(29.5)	19.5	---	---	---	15.8	125	115	10	.94	1.57	.66	---	Field sketch
RGS	*26EU1012	NC	Chal.	Complete	36.1	36.1	35.3	---	17.0	7.2	---	---	3.0	7.0	145	98	47	.98	2.12	.42	---	Field sketch
ECN	*26EU1012	NC	Basalt	Base	20.2	(48.0)	(48.0)	---	(27.9)	16.2	---	---	5.8	12.8	137	117	20	1.00	1.72	.58	---	Field sketch
GCS	26EU1015	1	Chert	Tip gone	51.5	(50.8)	(50.8)	---	18.5	3.3	5.8	5.5	5.6	8.2	202	59	143	1.00	2.74	.17	---	
RGS	26EU1017	1	Chert	Base/mid	30.7	(44.7)	(44.7)	---	(22.6)	8.4	3.3	1.4	2.0	8.4	110	100	10	1.00	1.97	.37	---	Battered
RGS	26Eu1022	1	Chert	Base	18.2	(37.3)	(37.3)	---	21.9	9.5	3.0	1.0	1.9	9.3	153	117	36	1.00	1.70	.43	---	Field sketch
RGS	26Eu1022	2	Chert	Complete	32.7	32.7	32.7	---	14.0	9.0	3.9	1.5	1.5	6.6	199	130	69	1.00	2.34	.64	---	
ECN	26Eu1022	3	Chert	Battered	33.4	(35.9)	(34.2)	---	(22.8)	(18.0)	5.1	2.8	2.9	13.8	180	123	57	.95	1.57	.79	---	
EE	*26Eu1023	NC	Chert	Battered	31.1	(35.0)	(31.4)	---	(29.5)	14.6	---	---	2.2	11.1	215	120	95	.90	1.19	.49	---	Field sketch
ECN	*26Eu1024	NC	Chert	Base/mid	29.4	(45.2)	(44.5)	---	20.1	14.4	---	---	3.1	10.7	157	115	42	.98	2.25	.72	---	Field sketch
RGS	*26Eu1026	NC	Chert	Base/mid	19.7	(26.8)	(26.8)	---	(17.7)	10.0	---	---	1.3	7.7	129	120	9	1.00	1.51	.56	---	Field sketch
ECN	*26Eu1026	NC	Chert	Tip gone	31.7	(39.1)	(38.2)	---	23.8	17.7	---	---	3.5	12.9	171	127	44	.98	1.64	.74	---	Field sketch
HS	26Eu1030	1	Chert	Tip gone	34.3	(40.6)	(38.6)	12.8	(14.2)	12.7	4.1	1.9	2.0	----	---	---	--	.95	2.86	.89	.32	Serrated
GSS	*26Eu1040	NC	Chert	Base/mid	29.1	(38.4)	(34.6)	---	(22.7)	10.0	---	---	2.7	12.7	149	85	64	.90	1.69	.43	---	Field sketch
RGS	*26Eu1040	NC	Chert	Tip gone	18.2	(21.3)	(21.3)	---	(13.7)	5.0	---	---	1.3	4.8	133	90	432	1.00	1.55	.36	---	Field sketch
EE	*26Eu1040	NC	Chert	Complete	31.4	31.4	28.7	---	23.1	12.3	---	---	2.3	13.3	196	118	78	.91	1.36	.53	---	Field sketch
RGS	26Eu1041	1	Chert	Broken	24.1	(27.7)	(27.7)	---	(18.5)	8.1	3.1	0.9	1.3	4.9	143	130	12	1.00	3.20	.95	---	Incomplete
LSN	26Eu1053	1	Chert	Tip gone	26.9	(34.1)	(34.1)	---	17.4	15.7	5.1	2.4	2.9	10.7	228	150	78	1.00	1.95	.90	---	

Table 5 (Continued).

Type	Site No.	Spec. No.	Material	Portion	LS	LT	LA	LM	WM	WB	TN	Wt.	Est. Wt.	NW	DSA	PSA	NOI	(BIR)	LT/WM	WB/WM	Max. Wpos.	Comments
ECN	26Eu1053	2	Quartzite	Base/mid	29.2	(39.6)	(39.6)	___	(21.6)	(15.4)	4.8	2.5	3.2	12.4	167	116	51	1.00	1.83	.71	---	Battered
RGS	26Eu1054	2	Chert	Tip gone	27.0	(32.5)	(32.5)	---	16.5	6.3	3.2	1.2	1.3	5.8	114	106	08	1.00	1.96	.38	---	Unequal barbs
ECN	*26Eu1057	NC	Chal.	Broken	28.5	(39.5)	(39.5)	---	(25.9)	14.1	---	---	3.3	12.7	156	131	25	1.00	1.53	.54	---	Tip, tang gone

* Artifact not collected; typed from field sketch only

Measurements are in millimeters and grams; numbers in parentheses are estimated

Abbreviations:

ECN - Elko Corner-notched;
GSS - Gatecliff Split Stem;
RGS - Rosegate Series;
LSN - Large Side-notched;
EE - Elko Eared;
HS - Humboldt Series;
GCS - Gatecliff Contracting Stem.

Spec. No. - Specimen Number
LS - Actual Length;
LT - Total Length;
LA - Length of Longitudinal Axis;
LM - Length from Proximal End of Point to the Maximum Width;
WM - Maximum Width;
WB - Basal Width;
TN - Thickness;
MaxWpos - Maximum Width Position, LM/LT x 100;
NC - Not Collected;

Wt. - Weight in Grams;
NW - Neck Width;
DSA - Distal Shoulder Angle, between 90°-270°;
PSA - Proximal Shoulder Angle, between 0°-270°;
NOI - Notch Opening Index;
BIR - Basal Indentation Ratio, LA/LT;
Chal. - Chalcedony

Figure 6. Projectile Points.

A. Stemmed Point Haft Element (Eu930-1)
B. Humboldt Series (Eu1030-1)
C. Elko Eared (Eu983-1)
D. Gatecliff Split Stem (Eu902-1)
E. Gatecliff Contracting Stem (Eu1015-1)
F. Rosegate (Eu1022-2)

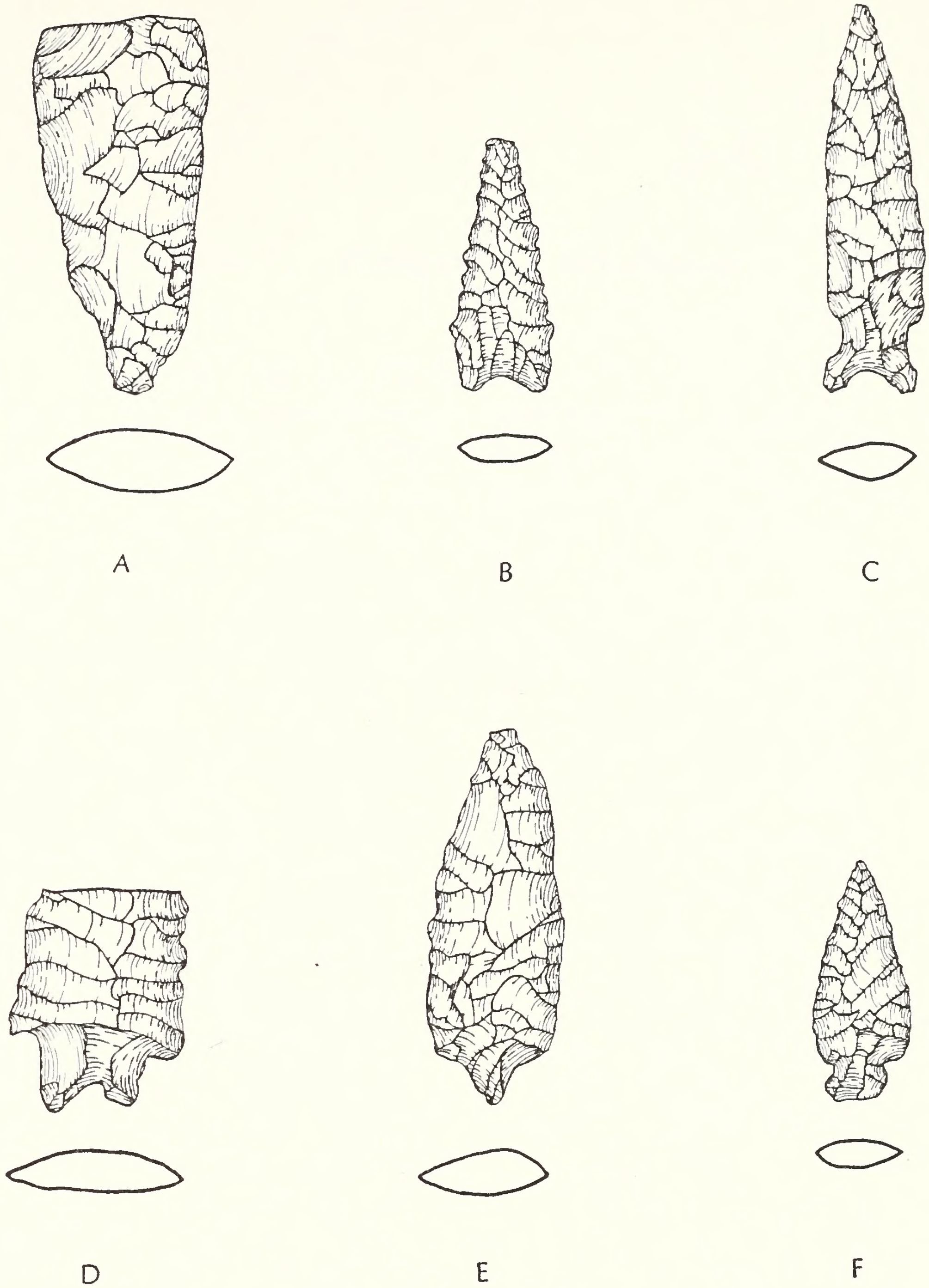


Figure 6. Projectile Points.

Figure 7. Prehistoric Artifacts.

A. Drill (Eu984-1)
B. End Scraper (Eu1022-4)
C. Flake Tool (Eu986-1)
D. Flake Tool (Eu1043-1)

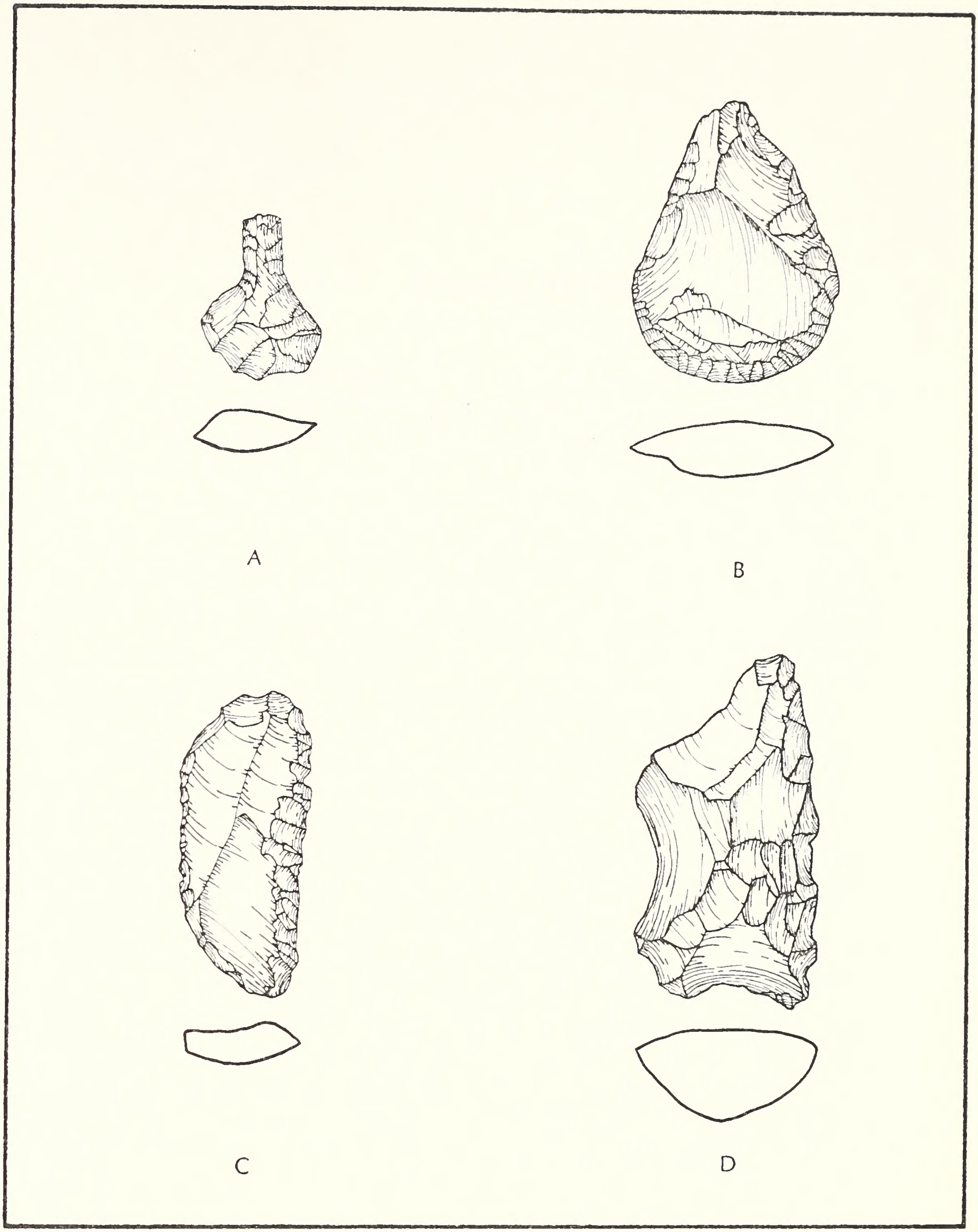


Figure 7. Prehistoric Artifacts.

Figure 8. Historic Artifacts.

A. Celadon Bowl Base, Exterior (Eu787-7)
B. Swatow Rim Sherd (Eu787-1-B)
C. Swatow Bowl Base, Interior (Eu787-1-A)

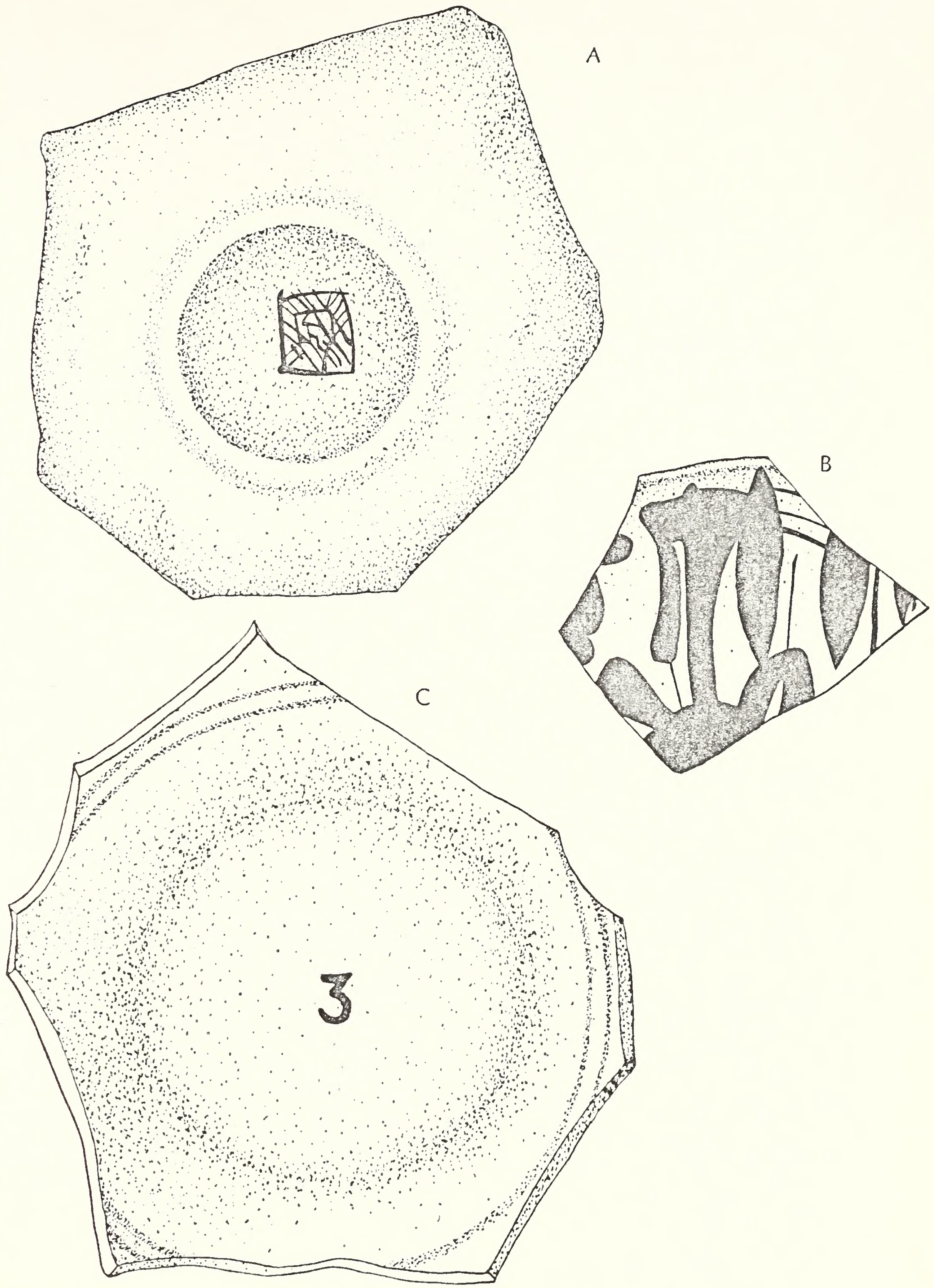


Figure 8. Historic Artifacts.

Figure 9. Historic Artifacts.

A. Baking Powder Jar and Lid (Eu1021-1)
B. Clay Pipe Bowl Fragment (Eu1011-2)
C. Opium Tin Lid (Eu998-2)
D. Insulator (Eu794-1)

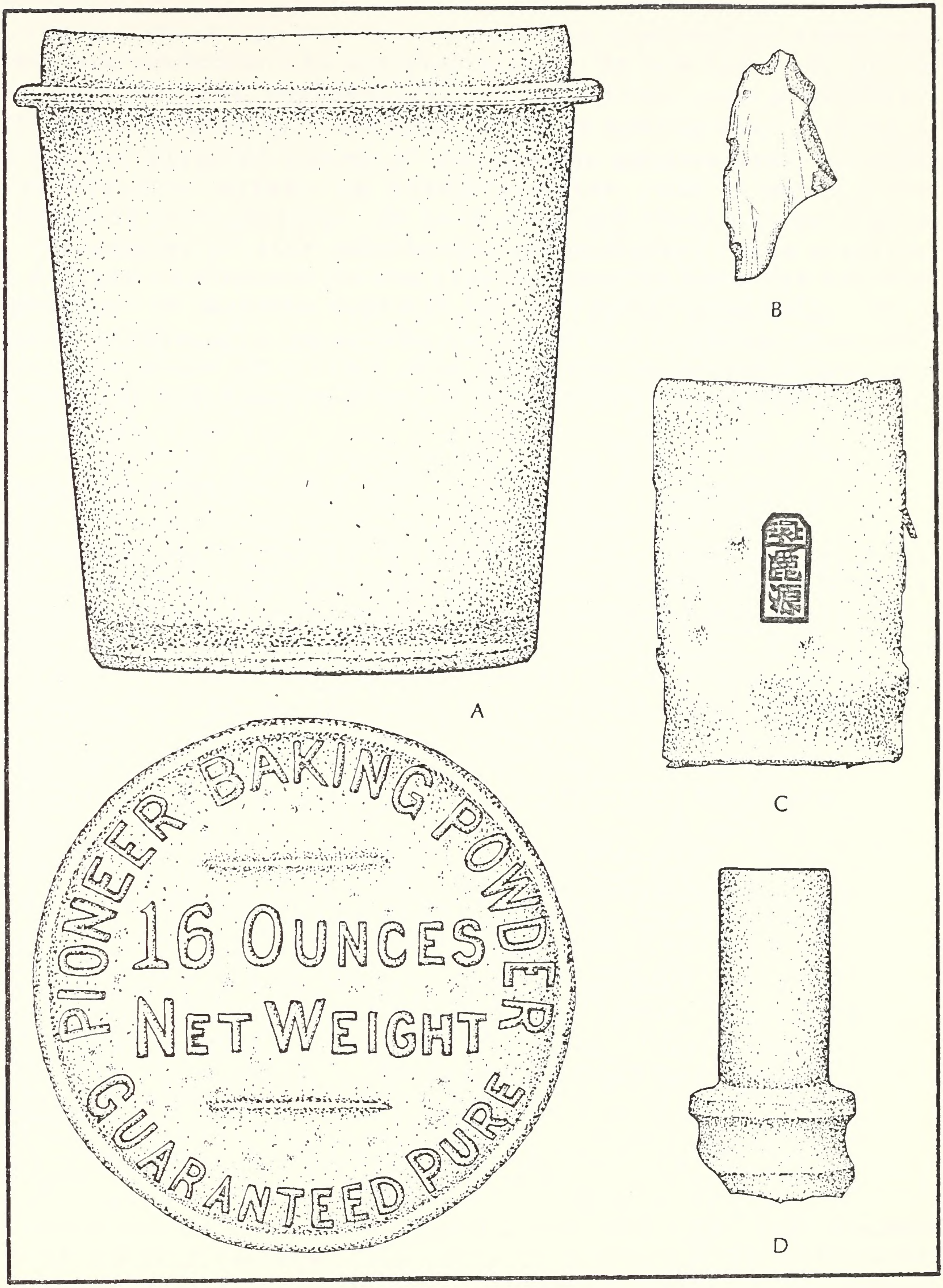

A
B
C
D
PIONEER BAKING POWDER
16 OUNCES
NET WEIGHT
GUARANTEED PURE

Figure 9. Historic Artifacts.

SITE DESCRIPTIONS

During Class III survey activities in the project area, 183 sites were recorded: 94 are prehistoric, 79 are historic, and 9 have both periods represented. In addition, one previously recorded site (Eu979) located at Mt. Hope Spring was revisited. The earlier Class II survey of the present project area recorded 27 prehistoric sites, 18 historic sites, and 3 sites with evidence of both periods. We have combined these two data sets for the purpose of site description and analysis, thus allowing the fullest assessment of the stated research concerns and the elaboration of National Register and mitigation proposals. As a result, prehistoric materials recorded at 121 sites, historic materials from 97 sites, and 12 sites with both periods represented are described below. The sites are summarized in Appendix B.

PREHISTORIC SITES

Prehistoric sites were classified as to type using the key depicted in Figure 5; and results are presented in Table 6. It should be noted that in certain cases our designations of sites discovered during the Class II survey may differ from those reported by James and Elston (1983). This is due to our adherence to a formalized key, while similar but intuitively assigned site types were used previously.

Table 6. Relative Abundance of Prehistoric Site Types.

Site Type	Number	Relative Frequency
Base Camp	4	3.0
Field Camp	24	18.0
Location	104	78.2
Cache	1	0.8
Total	133	

Base Camps

Base camps are rare in the Mt. Hope data set. The average area of the four recorded base camps is 21,800 square meters with a standard deviation of 38,808 (hereinafter standard deviations

will be reported as a ± value after the mean). This limited data set includes one very high value whose removal reduces the mean to 2414 ± 1319 square meters. Three of the four base camps are situated between 6750 and 7250 feet in elevation; the other is situated at an elevation of 6200 feet. All are located on relatively flat ground; three (75.0%) exhibit slope values lower than 10%. With regard to aspect, two have an eastern exposure, one a southern exposure, and the other a western exposure.

Debitage counts average 413 flakes per site. Ceramics and features were not observed at any of the base camps; ground stone was found at two. With regard to tool function categories, the food acquisition, type 1 general utility, and fabrication types are represented at all four base camps. Type 2 general utility tools are present at three, and food processing tools were observed at only two.

The distribution of base camps in the project area is of interest (see Figure 10); the spacing between sites is roughly equidistant and they are evenly distributed to the east and west of the ridgeline running north and south from Mt. Hope. The largest (Eu806) is located on the southwest flank of Mt. Hope. Consisting of numerous loci, this site contains ground stone and items from all five artifact categories (29 tools were observed), a pattern exhibited at no other site in the project area. The site is situated on a series of benches overlooking an ephemeral drainage which represents the closest available water.

The three remaining base camps are much smaller, not only in size but also in content. Artifact diversity, rather than abundance, permitted base camp designation. Each has four functional classes of artifacts represented in tool collections that include an average of only 6 ± 2 tools. One artifact less per site and all three might well have been typed as field camps. In fact, there are many similarities between these three base camps and Type B field camps as described below. One distinct trait of these base camps is the high density of their debitage assemblages.

Sites Eu809 and Eu815 are both located where steep mountain slopes join gentler slopes leading into Garden Pass Creek and Kobeh Valley, respectively. Eu790, on the other hand, is located further out into Garden Pass Creek valley, atop a small terrace overlooking Tyrone Creek. Water is most readily available at

sites Eu809 (a small spring is located 70 m to the northeast) and Eu709. Ground stone is present at Eu815.

Field Camps

A total of 24 sites was identified as field camps by the site type classification key. The average debitage count at these is 174 ± 243 flakes. Features were found at only one (4.2%), ground stone at eight (33.3%), and ceramics at five (20.8%). Overall, food processing tools occurred at nearly half (n=11, 45.8%) of the sites. With regard to tool function categories, Type 2 general utility tools were found at 23 (95.8%) of the sites and food acquisition tools at 20 (83.3%). All other categories were observed at fewer than half the recorded field camps.

Aspects recorded for field camps fall within all four exposure quadrants. Most, however, have either a western (n=9, 37.5%) or a northern (n=7, 29.2%) exposure. The relative abundance of sites with a northern exposure may reflect the temporary nature of field camps. Factors other than creature comforts were the prime determinants in site location.

While the range of observed slope values varied from 1 to 35%, the majority of field camps (n=20, 83.3%) fall between 1 and 15%. There is, however, little bias toward one end or the other of this range; slope values from 1 to 5% are as common as those from 10 to 15%.

Close investigation of the data suggests that the field camps can be divided into three subgroups. Our first clue to this was the site area data. The mean value is 13,645 ± 23,503 square meters. This distribution however, can readily be divided into two groups. The mean value of the lower group is 2297 ± 1988 square meters (n=16) while that of the upper group is 49,957 ± 24,160 square meters (n=5). These distributions are distinct at the first standard deviation. Field camps also tend to cluster in two elevational groups, 13 (54.2%) were recorded at elevations between 6250 and 6750 while 6 (25.0%) fall between 7000 and 7250 feet. There is a strong correlation between the site area and elevational clusters. Four of the five large field camps are located above 7000 ft. The remaining large camp is at 6750 feet, the upper bound of the lower group.

Based on these observations, we initially separated "large" Type A from "small" Type B field camps. Further examination of the Type B camps revealed that some had exceptionally low debitage counts, even though the number of tools present remained comparable. For descriptive and analytic purposes, then, we divided field camps into three groups; Types A, B, and C.

Type A Field Camps

Five sites are included in the Type A group of field camps. As previously noted, the mean area of these camps is 49,957 ± 24,160 square meters and they exhibit a mean elevation of 7038 ± 233 feet. All five are located on the west flank of Mt. Hope and the ridge line running south and then southwest from the summit. Three of the sites are situated atop ridges (or ridge complexes) that overlook ephemeral drainages; two are in high saddles separating two such drainages.

These sites are distinct not only in their distribution but also in the quantity of material present. Debitage counts average over 500 flakes (523 ± 321 flakes), the total count 17 ± 20 flakes. Ground stone was found at three (60.0%) of these sites, including both sites in saddles. Two, one of which was a saddle site, contained ceramics (40.0%). Projectile points and type 1 general utility tools were present at 100.0% of the camps while fabrication type tools were totally absent. The relative abundance of food processing tools suggests that these sites were inhabited for a longer period of time than the other types of field camps. The co-occurrence and abundance of hunting related tools (projectile points) and ground stone suggests that both hunting and collecting activities may have been carried out from these sites.

Type B Field Camps

Type B field camps are the most numerous (n=13) and are the most widely distributed; elevations range from 6060 to 7300 feet, with a mean of 6652 ± 424 feet. Unlike the other types of field camps, Type B camps do not exhibit any clear cut distributional trends. They also show considerable variation in site size, ranging from 314 to 6597 square meters with a mean of 2399 ± 2197 square meters. The mean debitage count observed was 114 ± 106 flakes, the mean tool count 5 ± 2 tools.

The most striking difference between Type A and Type B field camps is in the diminished abundance of select tool function categories. These include type 2 general utility tools (15.4% at Type B field camps as compared to 60.0% for Type A field camps), food processing tools (30.8% compared to 80.0%), ground stone (30.8% compared to 60.0%), and ceramics (7.7% compared to 40.0%). The only notable increase is seen in fabrication type tools which were present at 15.4% of the Type B field camps and at none of the Type A camps. When taken together, these data suggest to us that the predominant activities carried out at the Type B field camps are hunting related. Further, we suspect that they were occupied for shorter periods of time than the big camps.

Type C Field Camps

The six Type C field camps were grouped together due to the very limited amount of debitage present (12 ± 6 flakes). Observed tool counts at these sites are similar to those found at Type B field camps (5 ± 2). While the average size of these sites is somewhat low (1858 ± 577 square meters, n=5), the overlap between this distribution and that of the Type B field camps suggests that only limited significance can be attributed to the differences.

With regard to distribution, all six of the debitage-poor Type C field camps fall within a narrow elevational range (6617 ± 152 feet) and are situated around the margin of Garden Pass Creek Valley. All are located at the break point where the valley floor meets the much steeper front of the surrounding hills. Sites Eu1004 and 1009 sit atop small ridges overlooking Tyrone Creek as it flows into the valley, while Eu1050 and 834 are near McBrides Spring at the north end of the valley. Eu1056 and 810, on the other hand, are located at the head of a small canyon that forms the southern-most extension of the valley.

Differences between Type C camps and Types A and B field camps are most notable in three inter-group trends. First, the occurrence of projectile points steadily decreases; points were found at only 66.7% of the Type C camps. A second and similar trend is seen in the the occurrence of ground stone (found at only 16.7% of the Type C camps). Fabrication type tools, on the other hand, were found at more of the small camps (66.7%) than at either Type A or Type B camps; drills were the most frequent form

of fabrication tool observed (n=3, 50.0%). Hammerstones and cores make up the remainder.

The interpretation of this site group is somewhat difficult. They are distributed along the major ecotone that makes the boundary between Garden Pass Creek Valley and the hilly pinyon-juniper woodlands. Living at the ecotone allowed ready access to resources in both zones; the hills with their pine nuts and deer, and the valley with its grasses. An emphasis on ecotone living is most characteristic of resource-poor areas or hard times. If conditions are good, people tend to live in the middle of resource areas; when times are bad, they live near the ecotone in order to maximize their options. Perhaps Type C field camps represent use of this area during bad or so-so times. This would explain their distributional pattern, diminished content, and small size.

Locations

Clearly, locations are the most abundant site type, accounting for over three quarters of all the sites recorded in the project area. Consumed within this type are such ubiquitous traditional site categories as isolates and small lithic scatters. Features (stone circles) are present at 2 (1.9%) locations, ground stone was found at 3 (2.9%), and ceramics at 1 (1.0%).

Review of the site data allows several general observations. Site area was recorded for 18 non-isolate locations; the average area is 761 ± 1291 square meters. Several values at the upper end of the distribtion are notably different from the others. With regard to functional tool categories, only food acquision (n=31, 29.8%) and type 1, general utility tools, (n=28, 26.9%) were found at any number of sites. The remaining tool categories were observed at less than 10% of the locations.

Forty-four of the locations are isolated finds, represented by an isolated tool or piece of debitage. Of the other locations, 36 have both tools and debtiage present, 28 only tools, 38 only debitage, and two are isolated features. At locations with tools present, the average debitage count is 19 flakes. Where tools are not present, the average count drops to 6 flakes per site.

Locations With Debitage Only

The 38 locations that contain only debitage are quite limited in their content. Site area data derived at seven of these sites show an average of 171 ± 191 square meters. The mean flake count at these is 6 ± 7 flakes (n=38). Seventeen sites consist of a single flake; 13 others contain between 2 and 9 flakes. These 30 sites make up 56.6% of all the sites recorded in the project area with a debitage count lower than 10 (at least one tool was found at the remaining 43.4%). The remaining 8 sites contain anywhere from 10 to 25 flakes, accounting for 33.3% of all the sites we recorded in this range. The remaining 66.7% had tools present.

Clearly, the larger the debitage count at a site, the more likely it is that tools will be present. Our project data suggest that there is a 1 in 2 chance of the presence of a tool if the site contains fewer than 10 flakes. These odds increased to 2 in 3 at sites falling into the 10 to 25 flake category. At least one tool was found at every site with more than 25 flakes.

Locations With Tools Only

The 28 locations containing only tools form an equally interesting collection of sites. In only one case was more than one tool present (this site contained a projectile point and a type 1 general utility tool). Nearly 50% of the sites containing only one tool consist of an isolated projectile point (Table 7). Of these, only five were type identifiable, and all are Elko series. Sites with an isolated general utility tool are the next most abundant type. The two sites with processing tools are

Table 7. Relative Occurrence of Tool Function Classes as Isolates.

Tool Function Class	No.	%
Food Acquisition Tool	13	48.1
Type 1 General Utility Tool	8	29.6
Type 2 General Utility Tool	2	7.4
Processing Tool	2	7.4
Fabricating Tool	2	7.4
	27	

isolated occurrences of ground stone. Fabricating tools found as isolates include a projectile point recycled into a spokeshave and a single nodule of gray chert.

Locations With Both Debitage and Tools

The second most abundant (n=36) form of location is where both tools and debitage are present. These sites exhibit a higher average site area than the other forms of locations (1220 ± 1612 square meters) and the distribution is definitely skewed toward higher values. The debitage count averages 19 flakes with a standard deviation of 50. One large site with 300 flakes greatly inflates this value, however. Excluding this site from the assessment, the mean flake count drops to 11 flakes.

A majority of these sites contained only one tool type (n=28, 77.8%). Food acquisition tools (n=10) and general utility tools (n=16) predominate at these single category sites. Of interest is that one location contained ceramics in association with debitage but no other tools. Two or more tool categories are present at eight sites. In six cases, the assemblage is made up of projectile points and general utility tools. One of the remaining sites contains ground stone in association with a projectile point fragment, while the other contains multiple types of general utility tools.

Locations With Only Isolated Features

The two isolated features recorded as locations are both situated adjacent to Garden Pass Creek. One feature (Eu980) consists of a ring of rocks about 0.5 m in diameter that is infilled with colluvium. The second feature (Eu793) is a larger circle of stones (1.5 m diameter) that sits atop a small terrace overlooking Garden Pass Creek. This feature has one flake associated with it. Infilling has occurred to the point that the feature barely protrudes above the present ground surface. Possible interpretations of these features suggest that they are the remains of structures, caches, or some form of hunting blind. Given the absence of residential debris (debitage in quantity and tools) and the distance to any sizable stand of pinyon, the latter option is preferred here.

Caches

One site was identified as a cache by the site type key. This site (Eu982) is situated on a small ridge in pinyon-juniper woodlands at an elevation of 6430 feet. Present is a circle of stones that appears to have been stacked to a height of one or two feet at one point in time. This wall has since fallen down and now forms a single broad circle some 3 m in diameter. The circle has been infilled with colluvium. No artifacts are associated with the feature. Rocks used in constructing the ring appear to have come from a small bedrock outcropping just to the northeast of the feature. Our interpretation of the feature is that it probably served as a pinyon cache.

HISTORIC SITES

Historic period material has been recorded at 109 sites in the Mt. Hope project area (Figure 11). All the artifacts associated with the Eureka-to-Palisade stage and freight road have been dealt with as a single site. Similarly, all features and isolates relating to the Eureka and Palisade Railroad are dealt with collectively. Fifty sites document charcoal production activities in the area. The remaining 57, generally small historic sites, relate to several different activities that have taken place in the area.

The Eureka-to-Palisade Stage and Freight Road

An abandoned road which parallels Garden Pass Creek for a distance of some 2.2 miles is within the project area (Figure 12). We think it is part of the Ennor and Woodruff Stage Route (1870), and Pritchard's Fast Freight Route (1871) which connected the Central Pacific Railroad to the north with points south (James and Elston 1983:31-32). It is probable that both routes followed the same trail. In 1873, Woodruff, Ennor, and others formed a company to build a railroad between Eureka and Palisade, a project completed by others. Even after railroad construction, travellers in wagons or on horseback would have continued to use the trail until a better road was built. Traces of the road are located on stream terraces above the floodplain, at least 50' west of the Garden Pass Creek channel, and east of Highway 278. It has been eroded in several places by occasional ephemeral drainages. The road does not appear to have been elevated or otherwise engineered.

Figure 12.

Federal law requires that archeological site location data be held confidential.

The road and ten associated loci of historic material are recorded as Site Eu794. Six loci are individual items or fragments of a single artifact; three contain small amounts of debris which could represent either trash dumped by travelers or overnight campsites; one loci contains the remains of a wagon or sledge. A map of the examined portion of the old road can be seen in Figure 12; the location and contents of each locus are provided in Table 8, listed in order of their appearance from north to south along the road. The mileage figure indicates the distance south from the northernmost sighting of the road near the north boundary of the project area.

Artifacts present along the roadway provide an indication as to its period of use. Hole-in-top, soldered seam cans were manufactured in the United States beginning in 1810, and were most widely used between 1850 and the early 1900s (Rock 1980b). Purple glass fragments found at Locus D were probably made between 1880 and 1916. Manganese dioxide was added as a decolorizer to glass manufactured in the United States during this period, causing a purpling in the glass when exposed to the sun (Rock 1980a:16). Embossed bottles such as that found at Locus F were common between 1860 and 1900 (Kendrick 1967:71) (see Table 8). The Thatcher milk bottle was introduced in 1884 but was not widely used. In 1892 wide-mouth bottles began to be produced by a semi-automatic process called "press and blow" wherein "the glass was pressed into the mold to form its mouth and lip first. Then pressure was applied to blow the body of the vessel. This process was used for the production of fruit jars and also our early milk bottles" (Berge 1980:75). Olive, or black glass, such as at Locus H, is most often found at sites occupied between 1860 and 1880 (Rock 1980a:16). This evidence suggests that the roadway was in use between the 1860s and the early 1900s.

Artifacts present at Locus I appear to be somewhat different. Crimp seam cans (or double seam cans) were introduced during the 1850's but were not practical to manufacture until after 1894. Widespread use of these cans began about 1904 after the Sanitary Can Company was formed (Rock 1980b). Round or wire nails were invented in France between 1830 and 1855, but were headed by hand. In 1855 an automatic nail making machine was invented by the French, and soon the machines were produced in the United States. Around 1890 wire nails began to outnumber cut nails (Berge 1980:256). Also present at Locus I was what appears to be a bakelite insulator (see Figure 9d). These data indicate

Table 8. Artifact Loci Associated With the Eureka-to-Palisade Stage and Freight Road (26Eu794).

Locus (Temp No.)	Distance S of N End of Road	Artifact Assemblage
A	0.13 mile	hole-in-top cans; milled wood.
B(138)	0.55 mile	glass fragments.
C(135)	0.63 mile	one hole-in-top can.
D(139)	1.20 miles	purple glass fragments.
E(163)	1.30 miles	hole-in-top soldered seam cans.
F(164)	1.38 miles	glass fragments.
G(165)	1.45 miles	glass sherds.
H(174)	1.85 miles	wine bottle fragments.
I(181)	1.80 miles	can and debris scatter.
J(175)	1.95 miles	possible wagon, sledge, or cart remains; may be associated with Eureka and Palisade Railroad.

that locus dates to a later period than the others discussed above.

Just south of Locus J, the ridge on the east side of Garden Pass Creek forces the creek channel west, where it is presently diverted under Highway 278. Here traces of the old road disappear. About 1800' south, the road emerges on the west side of Highway 278 and runs southwest about 600', where it becomes obscured by the Eureka and Palisade Railroad. This was the last clear evidence of the road that we observed. Quite possibly, further evidence of the road can be found both to the north and south of the project area.

The Eureka and Palisade Railroad

Some 5.5 miles of the Eureka and Palisade Railroad grade (Site Eu787) traverse the project area. Thirty-six features were recorded along the railroad route, 31 of which are related to water run-off control. Run-off control features include: 13 intact, simple wood box culverts; 4 washed out wood box culverts; 1 complex wood culvert; 2 ferrous metal pipe culverts; 10 washouts which once had been bridged; and a run-off diversion trench. The other five features include: a railbed retaining wall and debris scatter; two dug-outs; the Summit Station water tower; and the Garden Pass and Summit stations. In addition to the features, 21 isolates were recorded along the grade. These are listed and described in Table 9.

For most of its route, the grade bed was obvious, constructed on either cuts or fills to maintain a consistent grade. The bed disappears under Highway 278 at the north end of the project area just south of McBrides Spring; about a mile of the bed is obscured near the southern end of the project area where Garden Pass Creek enters Diamond Valley. The rails were removed for scrap metal during the Second World War, but in many places ties are still on or near the grade bed.

Simple Box Culverts

The railroad grade and the features and isolates recorded in association are depicted in Figure 13. Features A, D, I, J, U, V, X, AA, BB, CC, FF, GG, and HH are simple wood box culverts; each is still intact. The culverts were constructed to channel water flowing in small ephemeral drainages. They are all similar, with variations dependent upon the size of the rill and the width of the grade base. Figure 14 depicts Feature A, a culvert typical of this type.

Each culvert was first constructed as a box: sides were 1.5 to 2' tall and long, consisting of 3" x 12" planks. The long boards in sides more than one board high were either pinned by toenailing or by lapping a third board across the joint. The tops and bottoms consisted of numerous shorter boards laid across the sides and nailed to them. Finally, the box was laid on a foundation of head-sized boulders then covered with fill to the height of the grade. The culverts were set perpendicular to the grade, often extending beyond the fill on the downstream side.

Figure 13.

Federal law requires that archeological site location data be held confidential.

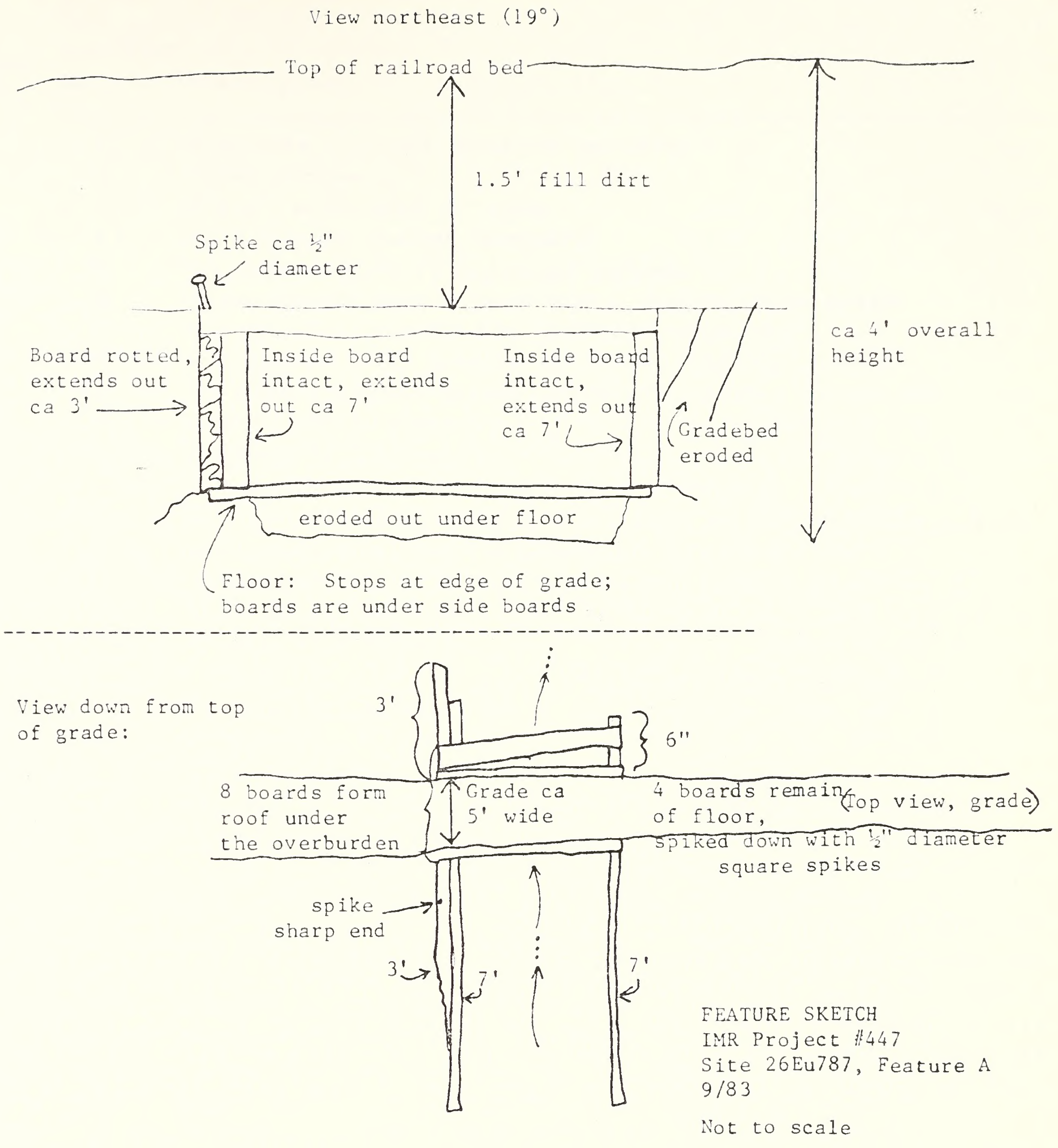

View northeast (19°)
Top of railroad bed
1.5' fill dirt
Spike ca ½" diameter
ca 4' overall height
Board rotted, extends out ca 3'
Inside board intact, extends out ca 7'
Inside board intact, extends out ca 7'
Gradebed eroded
eroded out under floor
Floor: Stops at edge of grade; boards are under side boards
View down from top of grade:
3'
6"
8 boards form roof under the overburden
Grade ca 5' wide
4 boards remain of floor, spiked down with ½" diameter square spikes
(Top view, grade)
spike sharp end
3'
7'
7'
FEATURE SKETCH
IMR Project #447
Site 26Eu787, Feature A
9/83
Not to scale

Figure 14. Simple Box-type Culvert (26Eu787, Feature A).

Table 9. Isolates recorded along Eureka and Palisade Railroad.

Isolate No.	Description
1	4 sherds Chinese Swattow pottery
2	metal straps
3	4"x12" wood beam 6' long
4	hard rubber gasket fragment
5	can containing 10 railroad spikes
6	olive glass bottle neck and 2 sherds blue glass
7	a 2 gallon hole-in-top soldered seam can
8	a 2 gallon hole-in-top soldered seam can
9	diffuse charcoal spread over 100' diam.
10	number not assigned
11	2 glass fragments
12	2 fragments applied lip bottle neck
13	pile of fieldstone ca 1.5 m diameter (const. materials?)
14	cast-iron stove parts embossed "L & H No 150"
15	scattered charcoal, 50 m diameter (charc. loading zone?)
16	dirt spoil (6' dia., 1.5' high) with railroad ties in it
17	2 hole-in-top cans
18	3-4 short lengths round poles ca. 1'x6' and 1 hole-in-top can
19	sledge
20	amber crown cap bottle
21	several piles of fieldstone (construction materials?)
22	square nose scoop shovel

The narrowest culvert was 12" wide (Feature J), the widest 36" (Features A, AA and BB). The longest was 30' (Features AA and GG) and the shortest was 6'8" (Feature U). The most deeply buried was under 11' of fill (Feature A), while Feature D was under only 16" of fill. The fill above the culvert at Feature AA is unique in that it was faced with rock on the upstream side.

Washed-out Culverts

Features N, K, P and EE, once culverts of the same style as above, have been completely washed out. Feature N is at the junction of two small drainages; the rock sink remains; but wood fragments, metal straps, bolts, nuts, and spikes have been washed downstream. At Feature K, imported volcanic rocks remain in the

channel, but the 3"x12"'s are now off to the sides of the bed, perhaps a result of rail removal. At Feature P, the boards lie tumbled within a washed-out gap in the bed. Only the drainage rocks remain in the channel at Feature EE.

Complex Culvert

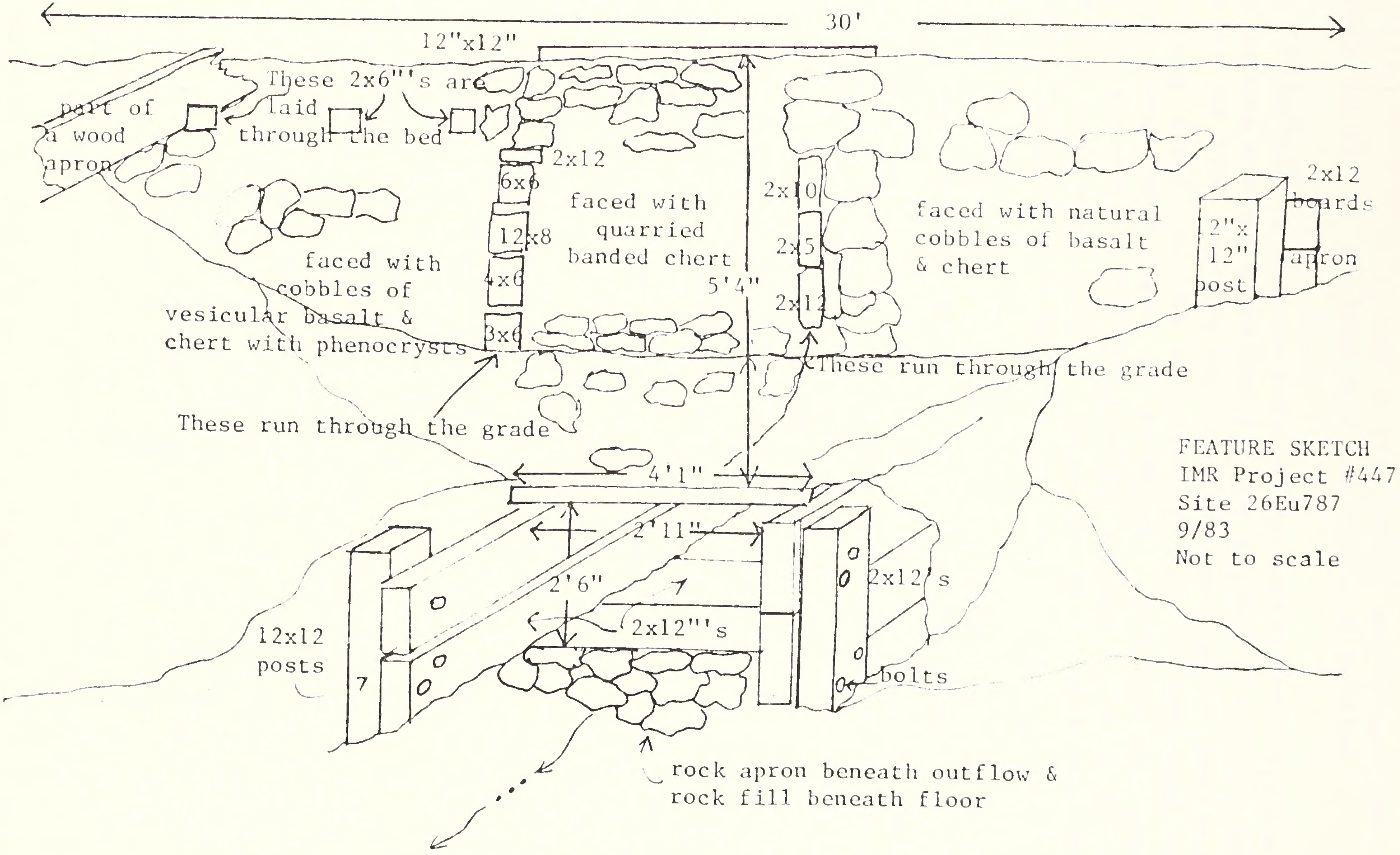
Feature Y, a much more complex version of the box-type culverts, was built of 12"x12"'s sunk into the ground with 6"x12"'s bolted to them, forming a culvert 2'6" tall, 2'11" wide and 35' long. There is 5'5" of fill over the top of the culvert, reinforced with at least 10 posts of different sizes (6"x6", 12"x8", etc.) laid lengthwise through it. An apron of 2"x12" boards, secured by 12"x12" posts faces each end of the downstream side of the grade. Both upstream and downstream sides of the fill are faced with naturally occurring field cobbles, imported basalt cobbles, and quarried chert. This is the most intact feature we observed along the railroad grade (Figure 15).

Pipe Culverts

Features H and O are metal pipe culverts. Feature H is intact and easily seen on the downstream side; the upstream side is silted in. Downstream, a retaining wall formed of 2"x6"'s, 4"x6"'s, and 2"x12"'s protects the culvert pipe. The pipe is made of sections of ferrous sheet metal riveted together. The fill above the culvert appears imported; rocks are laid in below the pipe. Wire nails were also found at this location. Feature O has washed out, and the pipe is lying half out of the hole left in the grade. The pipe is the same style as at Feature H, but there is no retaining wall or rock facing.

Bridges

Ten features (C, T, DD, S. M, Q, W, Z, G, and L), are gaps which formerly had been bridged in various ways. Features C, T, and DD are now empty spaces. At Feature T, 11"x8" wooden beams 16' and 23'6" long are washed downstream along with 1'5" long metal cribbing rods. At Feature C traces of beam ends could be seen on the facing banks of the railroad grade. Feature DD, located immediately south of the road leading to the Mt. Hope Mine complex, has been completely destroyed, possibly when the road was constructed.


30'
12"x12"
part of
a wood
apron
These 2x6"'s are
laid
through the bed
2x12
6x6
12x8
4x6
3x6
faced with
quarried
banded chert
faced with
cobbles of
vesicular basalt &
chert with phenocrysts
5'4"
2x10
2x5
2x12
faced with natural
cobbles of basalt
& chert
2"x
12"
post
2x12
boards
apron
These run through the grade
These run through the grade
4'1"
2'11"
2'6"
2x12"'s
2x12's
12x12
posts
bolts
rock apron beneath outflow &
rock fill beneath floor

FEATURE SKETCH
IMR Project #447
Site 26Eu787
9/83
Not to scale

Figure 15. Complex Box Culvert (26Eu787, Feature Y).

Feature S occurs where the grade is low and consists of a 12"x12" beam laid across the north face of the grade and supported by short 12"x12" posts. The south bank is washed away so that it is not evident how the gap was bridged.

Feature M is the northernmost crossing of Tyrone Creek, at what is now a very wide gap in the stream channel. The visible remains of the feature consist of just three horizontal slots measuring 3"x12" in the west-facing side of the east bank of the grade; the other bank is slumped. Downstream are a bridge section formed of 6"x12" boards spaced with 3/4" round pipe segments and wood debris. Pipe spacers were not observed in bridge construction elsewhere.

The remaining five features in this group are the most elaborately engineered crossings we observed in Garden Pass Valley. At Features Q, W, and Z wooden aprons face the cut banks; they are more sturdily built on the upstream side. The facings are made of 12"x12" posts sunk in the ground in either a U-shaped pattern around the base of the bank or flat against the face, supporting 3"x12" planks laid horizontally against the face of the fill. These aprons have now slumped away from the grade. At Features Q and W, some areas of fill above the aprons were faced with imported volcanic rock, placed to protect fill from the main force of the water. At Feature W (Figure 16) the timbers are notched and doweled together; and where the sill plate has rotted away, the figures "No 12" are painted onto the top of a 12"x12" which supports an apron corner. In the stream channel a 12"x12" post still holds one of the beams which bridged the gap. Feature Z is very badly deteriorated, but apron remains are still to be seen.

The main constructions at Feature G (Figure 17) have been washed out. This is a wide gap where the railroad begins to swing sharply west from its north-south course. The south bank is completely faced with stones the entire height of the bank, about 20', and back from the face for 28' on both the upstream and downstream sides. In addition, on the upstream side are the remains of a wood apron near the top of the fill. The north bank of the grade looks very eroded; a buried beam is visible at the base of the bank, but no rockwork or apron is present.

Feature L, the southernmost crossing of Tyrone Creek, is the most complex "bridge" construction encountered. The bed is

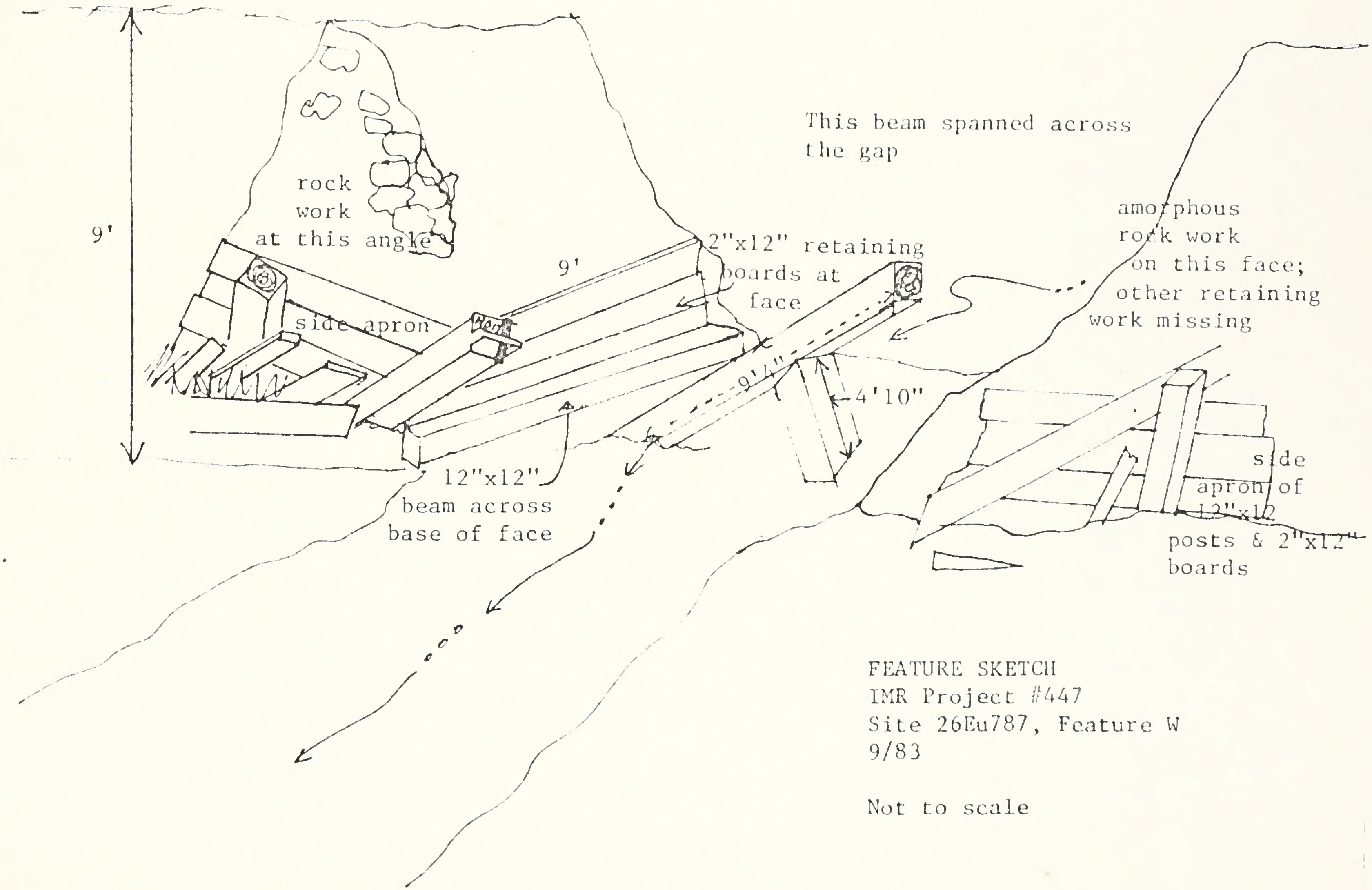
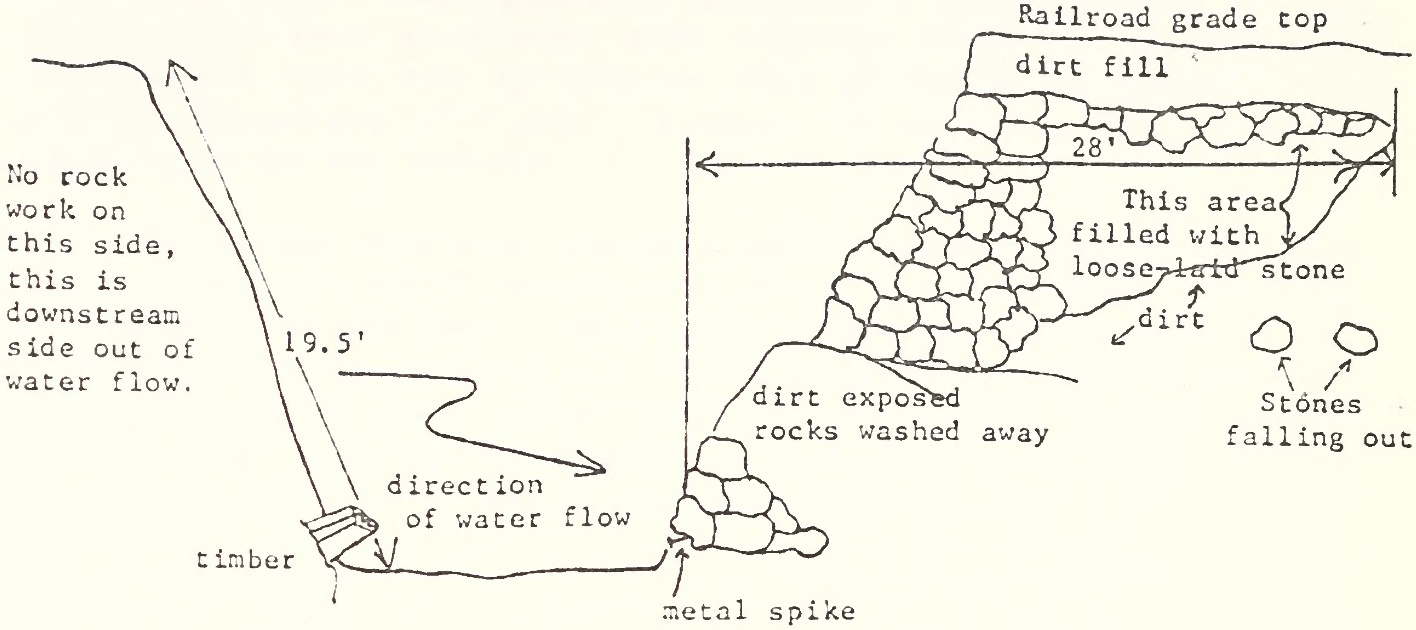

9'
rock
work
at this angle
side apron
9'
2"x12" retaining
boards at
face
This beam spanned across
the gap
9'4"
4'10"
12"x12"
beam across
base of face
amorphous
rock work
on this face;
other retaining
work missing
side
apron of
12"x12
posts & 2"x12"
boards
FEATURE SKETCH
IMR Project #447
Site 26Eu787, Feature W
9/83
Not to scale

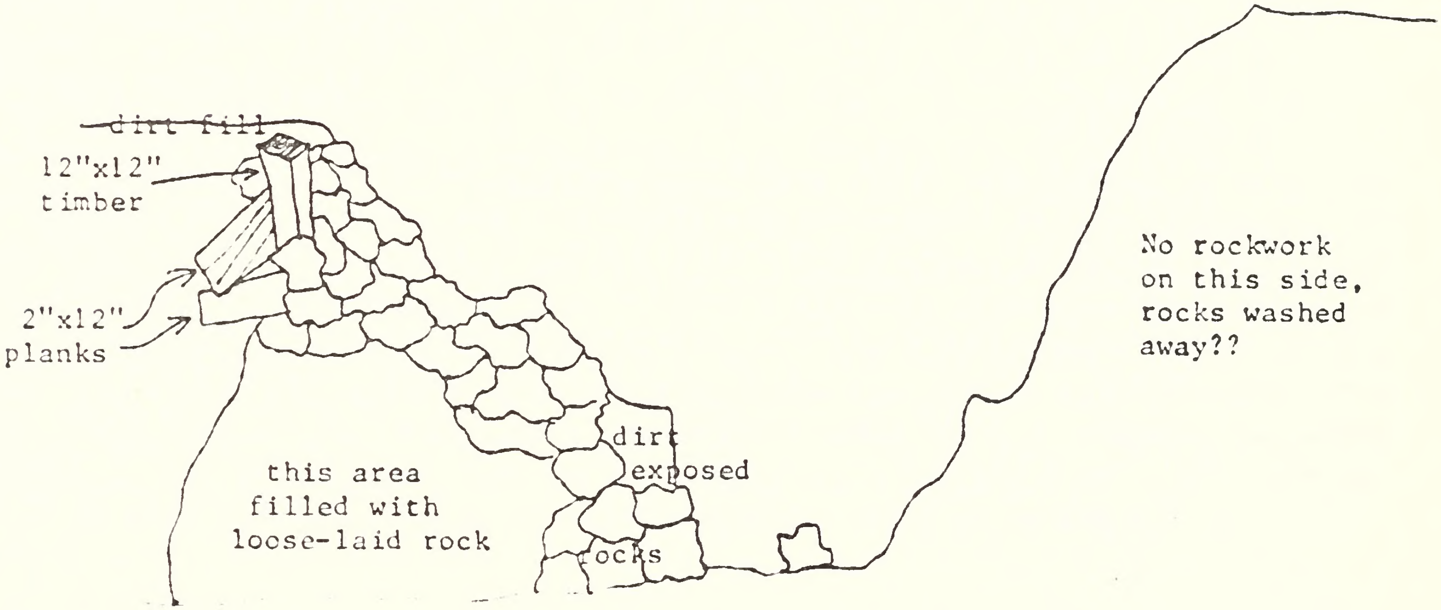
Figure 16. Washed-out Bridge Structure (26Eu787, Feature W).

FEATURE SKETCH
IMR Project #447
Site 26Eu787, Feature G
9/83

Not to scale


Railroad grade top
dirt fill
28'
This area filled with loose-~~laid~~ stone
dirt
dirt
Stones falling out
dirt exposed rocks washed away
No rock work on this side, this is downstream side out of water flow.
19.5'
direction of water flow
timber
metal spike

View to 320° of the south bank, downstream side.


~~dirt fill~~
12"x12" timber
2"x12" planks
this area filled with loose-laid rock
dirt exposed
rocks
No rockwork on this side, rocks washed away??

View to 160° of the south bank upstream side

Figure 17. Washed-out Bridge (26Eu787, Feature G).

elevated about 14' above the creek floor. On both banks the fill is protected by a wood apron built of 12"X12" anchoring posts supporting a "U" of 3"x12" planks horizontal against the fill. Above the apron the fill is faced with rockwork. Two rows of three each pilings were sunk into the floor of the stream channel. One piling, washed downstream, is a 2" diameter by 7' long iron pipe. These probably supported a wood platform in the channel and were surrounded with volcanic rock. It is probable that beams were set upright on this platform to support the bridge spanning the gap. Figure 18 depicts the present appearance of the feature.

Two bridge sections, washed a short distance downstream, are constructed of 12"x12" beams with 3"x11"'s spiked down, notched, and doweled at the ends. The planking arrangement on each of the two sections is different; since railroad construction was proceeding with great haste when the line pushed through Garden Pass Valley, they may have been built by separate crews. Figure 19 depicts details of the bridge sections.

Diversion Trench

Feature E is a 10' deep channel dug through a ridge about 40' west of the railroad grade to divert the stream south away from the railroad. Lumber fragments are present on the ridge-top west of the trench.

Retaining Wall

Feature F is a railbed retaining wall and debris scatter on the west side of the railroad bed. The cribbing consists of 2"x12" boards stacked parallel to the elevated bed and retained by metal 1" diameter pipe driven into the ground. This type of retainer was seen elsewhere at some elevated sections of the railroad bed and occasionally where the grade was dug out. The debris scatter contains a galvanized wash tub, a 3-quart enameled pot, four hole-in-top cans, and a rectangular can with spout, handle and vent hole. A rock campfire ring is present.

Dugouts

Feature B and Eu790 consist of two small, shallow dugouts in a hillside and an associated debris scatter. Rocks are loosely laid along the back of one depression where a corner is

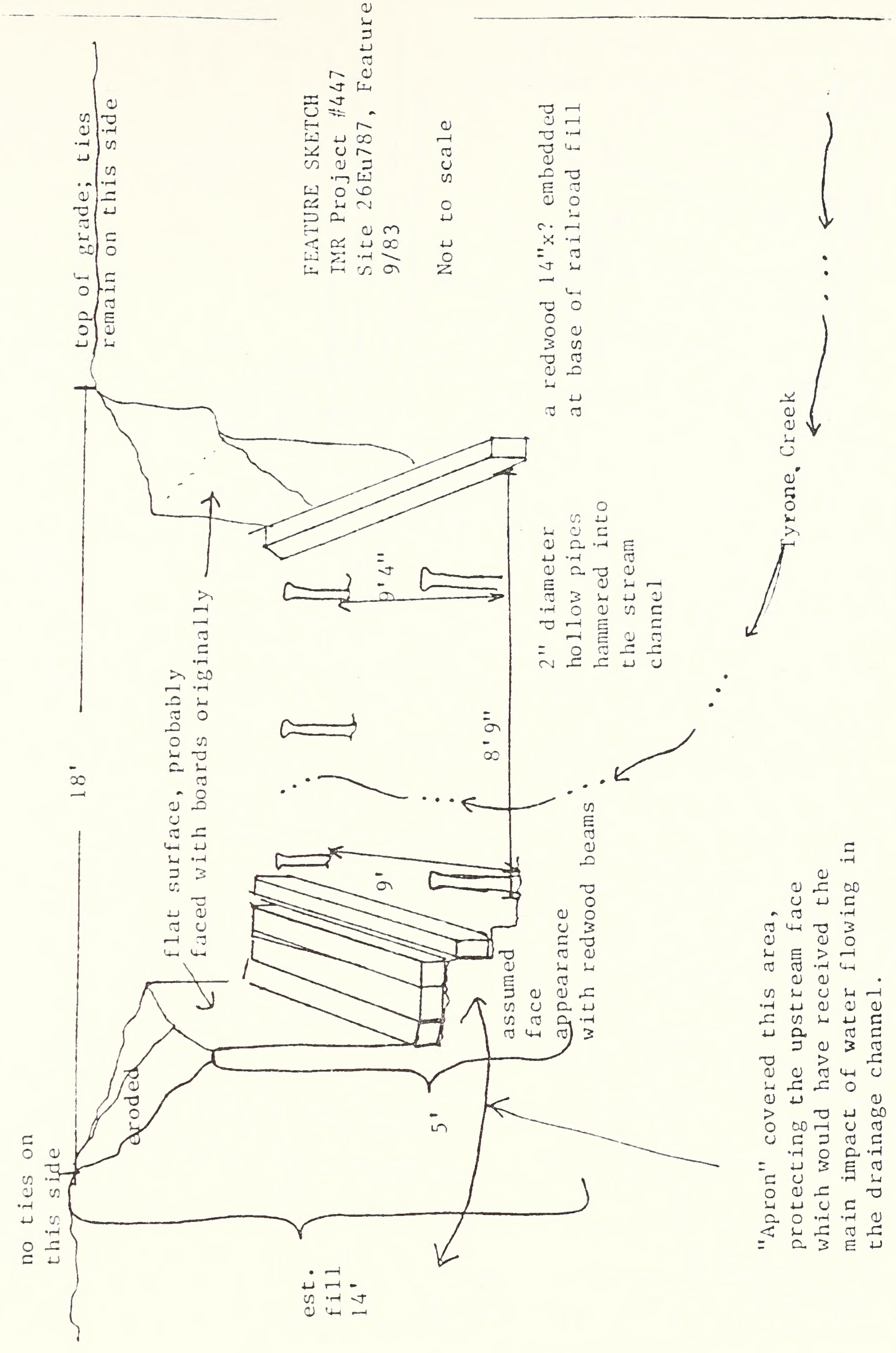
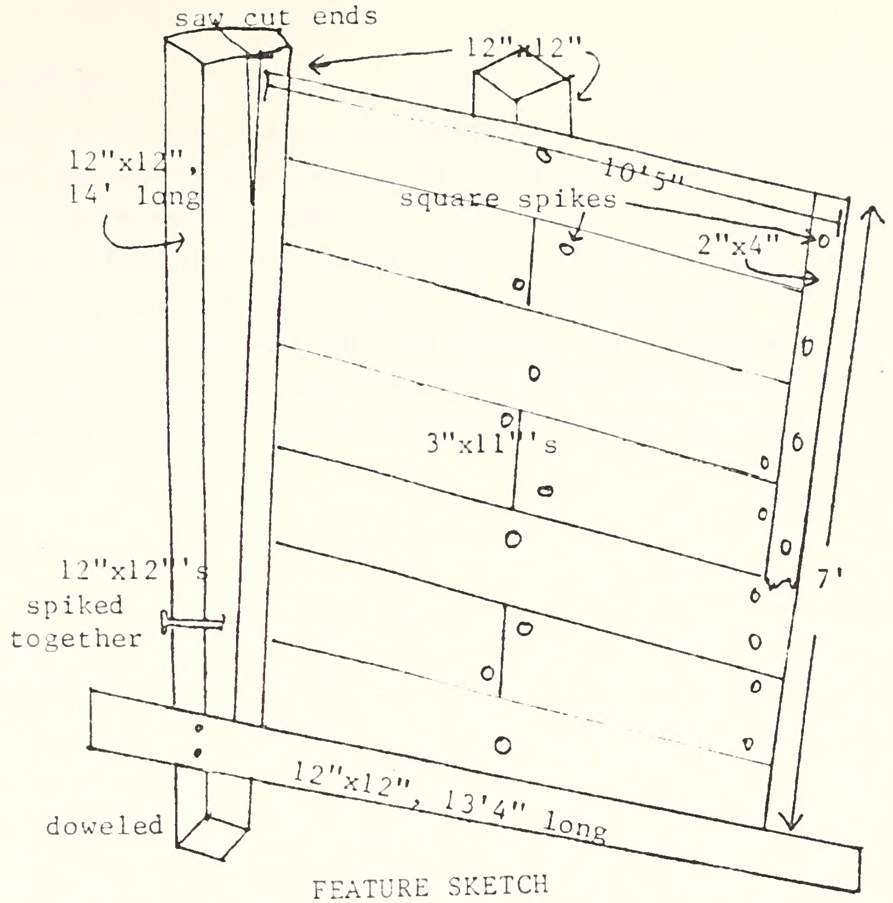

no ties on this side
est. fill 14'
eroded
18'
flat surface, probably faced with boards originally
5'
9'
assumed face appearance with redwood beams
8'9"
9'4"
top of grade; ties remain on this side
FEATURE SKETCH
IMR Project #447
Site 26Eu787, Feature L
9/83
Not to scale
2" diameter hollow pipes hammered into the stream channel
a redwood 14"x? embedded at base of railroad fill
Tyrone Creek
"Apron" covered this area, protecting the upstream face which would have received the main impact of water flowing in the drainage channel.

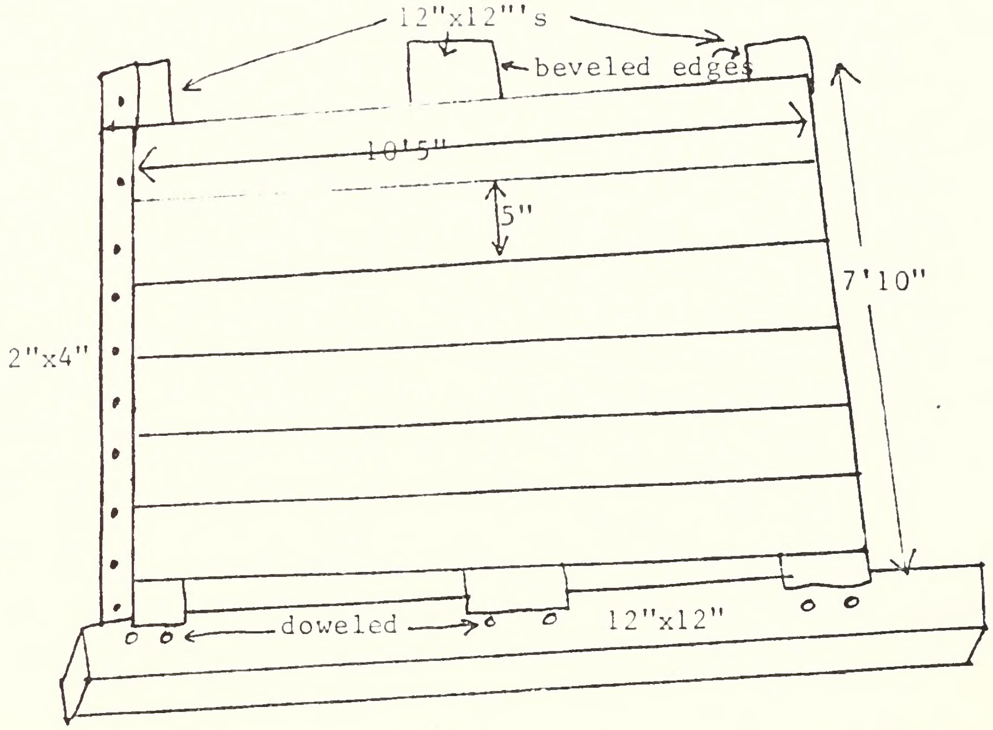
Figure 18. Tyrone Creek Bridge (26Eu787, Feature L).



saw cut ends
12"x12"
12"x12",
14' long
10'5"
square spikes
2"x4"
3"x11"'s
12"x12"'s
spiked
together
7'
doweled
12"x12", 13'4" long

FEATURE SKETCH
IMR Project #447
Site 26Eu787
Feature L
Tyrone Creek Bridge
9/83

Not to scale



12"x12"'s
beveled edges
10'5"
5"
7'10"
2"x4"
doweled
12"x12"

Figure 19. Detail of Tyrone Creek Bridge (26Eu787, Feature L).

obvious. The range of debris found around the depressions includes Chinese pottery. Also present are about ten hole-in-top cans, two lengths of stovepipe, one horseshoe, railroad spikes and cut nails, one barrel hoop, milled wood, two metal buckets, a lard pail, a rectangular metal box with hinged lid, three fragments of thick white crockery, two fragments of thinwalled pottery glazed dark brown on the outside, one fragment of Celadon ware, one ceramic button, two fragments of patterned gray-glazed ceramic, two fragments of pasteware, and an "Armour & Co." lard bucket.

Summit Station

Feature II is the station of Summit. A siding is adjacent to the main track (4' separation) and there are ties on both grade beds, although the rails have been removed. A large debris scatter is on the east side of the two railbeds, with hundreds of cans (some hole-in-top but most crimped seam) and glass, ceramic, metal, and wood fragments. A small, collapsed wood platform, ca 1m x .5m, is on the west side of the tracks. Much of this debris dates from the late 1890s.

Summit Station Water Tower

Feature R is apparently the remains of the water tower that served the Eureka and Palisade Railroad steam engines. It is located 0.1 mile north of Summit Station in central Garden Pass Valley. A 1" diameter pipe projects about 18" out of the ground on the west side of the track, and a section of flume 6" wide by 4" deep with galvanized metal nailed on the outside at the bottom lies nearby. A debris scatter on both sides of the railroad bed includes stovepipe, a crown cap bottleneck, metal and wood fragments, wire nails, spikes, soldered seam cans, tobacco tins, window caulking and glass, and a glass bottle bottom embossed "Sand Spr. Kerr Glass 1918." The presence of the crown cap bottleneck and the wire nails dates the debris scatter to post-1890 but does not preclude the possibility of the site being used earlier than that.

Kneiss (1963) provides a photograph of a Eureka and Palisade train taking on water in terrain similar to that around Summit, so much so we think it is the Summit Station.

Garden Pass Station

Feature JJ is the station of Garden Pass. Evidence of the station includes a fairly sizable collection of hole-in-top soldered seam tin cans, sardine cans, glass fragments (including bottle necks with applied lips and an olive-colored bottle base with a pronounced kickup), and buckets. Other items include a section of stove pipe, part of a stove door, and several sizable scatters of cinder. Also present on this site is a small structure of unused railroad ties, roofed with 2" planks of various widths, mostly 2"x12"'s. The integrity of the cabin leads us to suspect it was built after the station was abandoned in 1938, even though the ties are unused.

Charcoal Production Sites

Fifty sites in the project area contain evidence of historic charcoal production; most (n=44) contain the remains of a single reduction pit. Historic artifacts were observed at only 18 (40.9%) of the single pit sites; typically a few hole-in-top cans, glass fragments, or pieces of metal. Multiple pits were found at six sites; historic artifacts were associated with five of these.

Four sites (Eu796, 800, 988, and 1042) are particularly significant because they appear to have served as Carbonari ranches--charcoal production operations centers. The largest of these is Eu800. It is located along a historic road which once connected the Summit and Diamond Valley railroad stations. Numerous smaller charcoal production sites are located along this road. Present at Eu800 are at least two charcoal pits, several ovens, two corrals, numerous cans, bottles, and other pieces of miscellaneous debris. James and Elston (1983:70) state that the site may have "...functioned as a supply point for charcoal crews, a livestock yard, and a central collection point for charcoal produced in the surrounding area."

Eu988 is located midway up a tributary of Tyrone Creek; seven other pits were recorded within the confines of this small drainage valley. The site contains at least three charcoal pits and has an extensive artifact assemblage suggesting that a structure was once present (nails, butchered bones, numerous dish fragments, and window glass).

Site Eu1042 is situated in a narrow canyon on the west flank of Mt. Hope and includes a small (10' by 8') dugout structure, a corral, and a hearth. Numerous artifacts were observed, including both hole-in-top cans, a mule shoe, wagon parts, and glass and crockery fragments. While no charcoal production appears to have taken place at the site, five charcoal pits are located in and along the edges of the drainage. A collier living at Eu1042 could have tended these production areas.

Site Eu796 is located to the east of Mt. Hope in the Sulpher Spring Range. Situated at the head of a small drainage that flows into Garden Pass Creek; the site contains two charcoal pits and a moderate scatter of historic debris. Three other sites (charcoal pits) were also recorded in this drainage.

The remaining charcoal pit locations also show a tendency to cluster, usually in small canyons; Upper Tyrone Creek is an example. In these cases, however, none of the sites stand out as probable Carbonari ranches.

Although we are not certain, Eu1021 may be related to charcoal production. It is south of Mt. Hope in the southwestern corner of the Mine Area. The site is dominated by a pit some 3-4 m in diameter with a pronounced berm around three sides. Two shovels, complete with handles, were found; one on top of the berm, the other inside the pit. Other artifcts observed include two brass shotgun shells, hole-in-top cans, numerous baking powder cans and lids, a purple glass baking powder jar, and numerous pieces of metal and cut wood. It does not appear that the pit had a structure built in or over it. In fact, it looks as though its excavators simply dropped their shovels and left.

Other Historic Sites

A wide variety of miscellaneous historic sites were recorded (n=55) during the Class II and Class III surveys in the Mt. Hope area. Most are probably related to either Carbonari, mining, or ranching activity. Six of the sites, however, can be classified only as 'other'. They include a length of chain with a hook on the end (possibly used in skidding cut pinyon to the charcoal pile), a cut down 55 gallon drum, a "Hercules Powder" dynamite box, a piece of a cast iron stove, an axe head, and a pile of axe cut wood. Discussions of the more distinct groups follows.

Picnicing in the Woods: A View From the Carbonari's Lunchbox

Numerous sites were recorded that probably relate to the intensive use of the area by the Carbonari during the 1870s and 1880s. Charcoal was not produced at these sites, nor did the Carbonari live at them. More than likely, they are the archaeological reflection of the field lunch; that brief period when seated below a friendly pine, one partakes of a special treat.

The most numerous site type is that which contains only hole-in-top cans (n=11). Nine sites contained hole-in-top cans and a limited amount of other debris (usually glass or pottery fragments), while another eight sites have fragments of other kinds of containers (coffee tins, can lids, bowls, tobacco tins, and an occasional wiskey bottle). Three sites contained only fragments of dishes, cups and plates primarily. Seven others contained only bottles or bottle fragments: medicine vials, champagne bottles, gin bottles, and the like.

One site that falls within this group deserves special consideration. Site Eu998 is located up a small cut leading off the south side of Tyrone Creek. Along with the usual hole-in-top tin cans and metal scraps, we found fragments of a champagne bottle, a piece of an embosed bitters bottle, and a complete opium tin. We called this the 'party down' site.

Ranching Related Sites

Ranching and agriculture in the Eureka vicinity began as support industries, providing produce to the mining towns. The 1890s saw a pronounced expansion in ranching, especially in sheep production, throughout Nevada (Creel 1964; Sawyer 1971). During our survey of the area, we recorded seven sites which are probably related to cattle or sheep grazing. All are located in the mountainous, or at least hilly, portions of the project area.

Three of the suspected ranching related sites (Eu1048, 1049, and 1051) are situated in a major gap in the Sulpher Spring Mountains just north of where Garden Pass Creek flows into Diamond Valley. They are located adjacent to the dirt road thought to be the Pony Express route. Artifacts include crimped seam sanitary cans, tobacco tins, and evaporated milk cans.

Eu804, located south of Mt. Hope in Alternate Site J, is a small scatter of debris containing several sections of stovepipe, large metal tins, barbed wire, a campfire ring, and other debris. Site Eu784 is located about one mile northeast of Eu804. It contains a segment of a juniper pole fence with a strand of barbed wire attached. The fence crosses a narrow drainage and then proceeds uphill a short distance. A small corral of juniper branches is located some 200 m upslope.

Isolated pieces of enameled cookware were present at two other sites (Eu877 and Eu952) in the project area. We feel that these also relate to post 1890 ranching activities.

Mining Related Sites

Three small historic period sites appear to be related to mining activities in the project area. The first (Eu990) is a pit some 2.5 m in diameter and 1.5 m deep, situated atop a narrow ridge which overlooks a tributary that flows into Tyrone Creek from the south. Severly tilted bedrock is exposed along this ridge and the pit was excavated down against the bedrock face. Material which appears to be slag is strewn around the pit area; none is present within the pit. No artifacts were found in association with the pit.

Eu836 contains evidence of quarrying at a large granite-like outcrop located along the eastern flank of Garden Pass Creek. James and Elston (1983:72) propose that the site may have been a quarry for rock used as fill in construction of the Eureka and Palisade Railroad. In our examination of features associated with the railroad, however, we did not find that quarried stone of this type had been used. Perhaps the site is related in some way to mineral exploration.

Eu799 is a rock cairn with axe cut poles inserted into it. This cairn is located in the Sulpher Spring Mountains along the eastern margin of the project area. Possibly it served as an early claim marker.

SITE DATA ANALYSIS

In an earlier section, we identified a number of prehistoric and historic research concerns relevant to the Mt. Hope project area and developed research expectations for each concern. In the following discussion, we evaluate these research concerns in light of the information gathered during the Class II and Class III surveys.

PREHISTORIC RESEARCH CONCERNS

The four primary research concerns for the Mt. Hope area are cultural chronology, settlement types, general settlement location patterns, and base camp locational parameters. We obtained substantial information with regard to each and our analysis is structured according to the specific questions outlined in the Methods section of this report.

Cultural Chronology

Would the pre-Archaic Sites Please Stand Up?

We did not expect to find many pre-Archaic sites and anticipated that if any were found, the site type key would classify the majority as locations. Pre-Archaic field camps were expected to have been less abundant and all located near permanent water sources.

Only one site contained an artifact possibly attributable to the pre-Archaic. A fragment of a stemmed projectile point was found at Eu1015, a site located along the west facing slope of a small canyon southwest of Mt. Hope. Using our site type key, Eu1015 barely qualified as a field camp, and it is not near a permanent water source. Also present at the site, however, was a Gatecliff series point, several biface fragments and debitage. If the stemmed point is pre-Archaic in age, then the site is a palimpsest (overlapping sites of cultural materials from different occupations) containing at least two components; an Early Archaic camp overlying a pre-Archaic The survey results supports our prediction that very little use was made of the project area during pre-Archaic times.

In the central Great Basin, basalt (as a material for the production of tools) appears to have been the most popular during

pre-Archaic times (Elston, Davis, and Clerico in press; Elston 1982). Several sites in the project area yielded quite large basalt tools or contained basalt in their debitage assemblages. One must consider the possibility that these items were deposited during the earliest occupation of central Nevada.

Basalt tools and/or debitage were observed at 18 sites. Three contained basalt projectile points, all of which are the Elko type. Five additional sites with basalt can be assigned to a chronological period because of the presence of diagnostic projectile points; four single component sites with Elko points and one multi-component site which includes Large Side-notched, Elko, Rosegate, and Cottonwood points. Basalt bifaces (n=8), scrapers (n=3), and choppers (n=2) tend to be larger than their non-basalt counterparts, especially the scrapers and choppers (Eu983). A majority of these larger tools are not associated with diagnostic projectile points. Basalt is the dominant lithic material at only two sites (Eu788 and Eu1016), one of which is dated by the presence of an Elko projectile point. Basalt is present in the debitage assemblage of numerous sites, frequently as one of the least dominant forms. In summary, basalt use in the Mt. Hope area occurred during Middle Archaic (Elko) times. There is no evidence to suggest that use of basalt was confined to the pre-Archaic.

Who Liked the Woods the Most?

If the project area was not used a great deal during pre-Archaic times, then when was it the most heavily used? During the Class II and Class III surveys, we recorded 109 projectile points, 63 of which could be assigned to a type. Information on the abundance of each point type is shown in Table 10, along with the number of sites at which each type occurred.

If the information contained in this table is broken down by major adaptive strategy, then the Mt. Hope vicinity was used primarily by Archaic populations. Of the datable components, 85.7% are Archaic, a figure almost identical to that realized during the earlier survey of only 10% of the area (James and Elston 1983:92).

Table 10. Number of Typed Projectile Points Observed and Their Distribution Across Sites.

	No. of Points	No. of Sites	% of Total Site Sample at Which Type Occurred*
Stemmed	1	1	0.8%
Large Side-notched	2	2	1.5%
Humboldt	1	1	0.8%
Gatecliff	3	3	2.3%
Elko	38	25	18.8%
Rosegate	12	11	8.3%
Cottonwood	3	3	2.3%
Desert Side-notched	3	3	2.3%
	63	49	

* Total number of sites=133

There are subtle differences, however, between the Class II predictions and the final survey results. The Class III survey revealed six (12.2%) components assignable to the Devils Gate Phase of the Early Archaic, whereas none had been recorded during the earlier stage of field work. The Middle Archaic Reveille Phase, noted by the appearance of Elko projectile points, accounts for 51.0% of all datable components (up from 47.1% in the Class II survey). Components of the Late Archaic Underdown Phase are the next most abundant, with 11 components (22.4%). The Class II survey suggested that 17.6% of the datable components should be assignable to the Late Archaic Yankee Blade Phase, but Class III survey demonstrates that this phase is represented at only 12.2% of the datable components.

Settlement Types

In general, the site type key developed for this project worked quite well. Sites clustered by the key exhibit a fair number of intra-group consistencies and inter-group differences. Site types are very distinct with regard to the number of functional tool categories present (Table 11) and the amount of debitage present (Table 12). The field camp and location

subtypes indicated in Table 12 are those defined in the Site Description section of this report. Type A field camps are large in size and located to the southwest of Mt. Hope. Type C field camps are smaller and are situated around the margin of Garden Pass Creek Valley.

Table 11. Number of Functional Tool Classes Present by Site Type.

Site Type	Number of Functional Classes					
	1	2	3	4	5	
Base Camp				3	1	4
Field Camp		6	13	4		23
Location	56	7	2			65
	56	13	15	7	1	

Three methods were discussed above for assessing the validity of site clusters indicated by the site type key. These dealt with site size, lithic assemblage variability, and tool-to-debitage ratios.

Average site areas for each site type and subtype are given in Table 13. These data show that site type is not always well correlated with site area. There is a nice progression in mean size from locations to field camps to base camps, but this breaks down when subgroups are considered. Small base camps are the same size as Type B field camps; Type C field camps are only slightly larger than locations that contain both tools and debitage.

As discussed previously, one must consider whether a site has been reoccupied and the effects this may have on site size and assemblage composition. Palimpsests present a serious problem to interpretation. Are large base camps and Type A field camps palimpsests? If so, of what? For instance, is Eu1022 (a Type A field camp) a palimpsest of several field camps, of a field camp and a location, or of a base camp and something else? At this point, there is no way to tell.

Table 12. Average Debitage Count by Site Type and Group.

Site Type	N	Mean	SD.
Base Camp	4	413	225
Field Camp	24	174	243
Type A	5	523	321
Type B	13	114	106
Type C	6	12	6
Location			
Debitage Only	38	6	7
Debitage With Tools*	36	19	50

* 11±14 if an abnormally high value is excluded

Table 13. Average Site Area by Site Type and Group.

Site Type	N	X	SD.
Base Camp	4	21,811	38,808
Large	1	80,000	
Small	3	2,414	1,319
Field Camp	21	13,645	23,503
Type A	5	49,957	24,160
Type B	13	2,399	2,197
Type C	3	1,858	557
Location	18	761	1,291
Debitage Only	7	171	191
Debitage With Tools	10	1,220	1,612

Another clue to site type is variability of lithic types. The longer a site is occupied, the more types of lithic materials it is likely to contain. The number of lithic types observed in the debitage and in the tool assemblages is shown in Tables 14 and 15. It should be noted that the lithic categories we used are general in character, and more detailed laboratory analysis would probably increase their number. The clearest pattern in these tables is that debitage and tools from locations contain the

fewest number of lithic types. Number of lithic types in debitage is not significantly different between base camps and field camps, although field camp debitage assemblages show a slight bimodal pattern with peaks at 2 and 4 lithic types.

Table 14. Lithic Types Observed in Debitage.

	Number of Lithic Types							
Site Type	1	2	3	4	5	6	7	Total
Base Camp		1	1	1		1		4
Field Camp	2	5	3	9	3		2	24
Location	44	20	6	2	1			73
	46	26	10	12	4	1	2	101

Table 15. Lithic Types Observed in Tools.

	Number of Lithic Types				
Site Type	1	2	3	4	Total
Base Camp		2	1	1	4
Field Camp	3	12	4	4	23
Location	53	8	1		62
	56	22	6	5	89

A ratio was also calculated to assess the degree of intra-site assemblage variability. Ratio values (the number of lithic types present in the tools divided by the number of types in the debitage) are presented in Table 16 by site type. A ratio value of 1.0 reflects comparability in the number of lithic types represented in the tools and debitage, a lower value indicates that more types are present in the debitage than in the tools.

In our discussion of research methods, we presented several expectations for variability of lithic types. First, we expected that base camps would have more lithic types represented in both debitage and tools. However, this does not appear to be the case (Tables 16 and 17). Our second expectation with regard to base camps was that there should be a fair degree of agreement between

debitage and the tools at a site. This, we believe, is reflected in Table 16 by consistently high ratio values.

Table 16. Distribution of Lithic Type Variability Ratio Values by Site Type.

	0.00 0.39	0.40 0.59	0.60 0.79	0.80 1.00	Total
Base Camp			3	1	4
Field Camp		9	6	8	23
Location	2	12	3	17	34
	2	21	12	26	61

Table 17. Distribution of Debitage/Tool Ratio Values Across Site Types.

	Debitage/Tool Ratio							
Site Type	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-Up
Base Camp			1		2		1	
Field Camp	10	7	1	1	1	2		2
Location	29	4	2			1		
	39	11	4	1	3	3	1	2

We expected that field camps would reveal a limited range of variation in the number of lithic types present in both debitage and tool assemblages and that the degree of concordance between the two would be moderate to low. On the first score, we failed miserably; of all site types, field camps exhibit the greatest amount of lithic type variability in both tools and debitage. Our only marginal victory is that ratio values do show a tendency to be somewhat moderate.

Of all the site types, locations stand out as the most distinct. As anticipated, they have the fewest lithic types present in their debitage and tool assemblages. Ratio values exhibit a bimodal pattern. The 17 cases noted in Table 16 where locations have a high ratio represent small sites dominated by a

single lithic type. The second cluster includes sites where two types are present in the debitage; one in the tools.

Debitage-to-tool ratio values tend to meet our expectations, thereby providing the best verification of the site type key (see Table 17). It should be noted that a ratio of 1.0 reflects that tools and debitage are equal in number, higher ratios indicate the degree to which debitage dominates the assemblage. For example, the highest observed ratio of 107.1 reflects an assemblage made up of 750 flakes and 7 artifacts. Although base camp values are not as tightly clustered as we had predicted, they are moderate in magnitude; suggesting that even at very large sites such as Eu806, there is a somewhat consistent relationship between the amount of debitage and the number of tools.

Field camps, on the other hand, exhibit a much wider range of variation (debitage-to-tool ratios range from 1.3 to 107.1). Values are even slightly bimodal, which we also predicted. A majority (n=17) have relatively low ratios (1.3 to 16.8), while a smaller group (n=4) exhibits very high ratios. Ratio values were arrayed by field camp type to see if a single type may account for the group of very high values. No patterns were perceived; both Type A and B field camps are present in the group but neither dominate. All six Type C field camps, however, are concentrated in the lowest ratio category (1-10), reflecting their general similarity to locations. With regard to locations, they are, as expected, concentrated in the lower ratio categories, due mostly to the limited amount of debitage present rather than any overabundance of tools.

Subsistence and Settlement Patterns

In the Research Methods section, we described three subsistence and settlement strategies and what we thought the archaeological reflection of each would be in the Mt. Hope area. The first (Strategy 1) is based largely on a forager strategy which emphasizes high residential mobility. The second strategy (Strategy 2) presumes that a base camp is located nearby and that the project area is within its foraging radius. In the final option (Strategy 3), the base camp is farther away and the project area is within its logistical radius.

Each strategy can be reduced to a statement of whether particular site types should be present or absent. This provides a quick heuristic means of comparing our site data against the alternate strategies. Two issues are of relevance with regard to these subsistence and settlement strategies: the relative mix of site types present and their distribution by chronological period.

Application of our site type key reveals that locations (n=104) far outnumber either field camps (n=2), base camps (n=4), or caches (n=1). A comparison of these results with the site type expectations of the three strategies is given in Table 18. This table shows that our data do not conform to any one strategy, but rather seem to reflect a blend between Strategies 1 and 3. This is not a fair test of the data, however, since several adaptive strategies and chronological periods are included within the overall data set. It is necessary to divide the Mt. Hope data into smaller, more meaningful units.

Table 18. Comparison of Mt. Hope Site Data With Alternate Subsistence/Settlement Strategies.

	Site Type Expectations			
	Base Camp	Field Camp	Location	Cache
Strategy 1	+	-	+	-
Strategy 2	-	-	+	~
Strategy 3	-	+	+	+
Mt. Hope Sites	+	+	+	+

A total of 25 sites contained projectile points typical of particular chronological periods. More than one component is present at ten sites; all except one contain Reveille Phase projectile points in combination with those of some other phases. Seven contain only two components; Reveille and Underdown Phase points are the most common combination (n=3), followed by Reveille and Yankee Blade Phase points (n=2). One site (Eu1011) has points representative of four chronological periods ranging from Devils Gate Phase through Yankee Blade Phase. This is a field camp situated in a prime hunting area, a high saddle at the head of two drainages.

The larger the number of distinct chronological periods represented at a site, the greater the potential for the site type designations to be in error. In such cases, the palimpsest of occupations is likely to contain evidence of functionally dissimilar activities. As a result, the key is likely to overrate the site, often elevating locations to field camps and field camps to base camps. Since there is a certain danger in including the ten multiple component sites in our comparison of data with the various expectation patterns, we focus only on single component sites (Table 19). Based on what is admittedly a small sample, we believe that this table allows for certain qualified observations.

Table 19. Comparison of Alternate Subsistence/Settlement Strategies With Data From Separate Periods.

	Site Type Expectations			
	Base Camp	Field Camp	Location	Cache
Strategy 1	+	-	+	-
Strategy 2	-	-	+	~
Strategy 3	-	+	+	+
Pre-Archaic	-	-	-	-
Early Archaic	-	-	+(2)	-
Middle Archaic	+(3)	+(4)	+(10)	-
Late Archaic	-	+(2)	+(2)	-
Numic*	-	+(1)	+(1)	-

* Based solely on occurrence of projectile points, ceramics not included

The Early Archaic Phase exhibits a pattern similar to our expectation of subsistence and settlement Strategy 2: Mt. Hope is within the foraging radius of a base camp which is located nearby but outside the project area. If the pre-Archaic component at Eu930 is a location, then Strategy 2 would also seem applicable to that adaptation.

Data pertaining to the Middle Archaic Phase do not directly match any of the identified patterns. The presence of base camps

leads one to suspect that Strategy 1 (typical of foragers) was operative. The very infrequent occurrence of caches also tends to give credence to this strategy. However, even if caches were more frequent, they rarely contain artifacts assignable to a specific period. Strategy 3 (typical of logistically organized collectors) is supported by the presence of field camps. As mentioned in the discussion of site types, several of the sites identified as base camps qualify for that designation by a very narrow margin, including two of the three base camps considered in Table 19. They may represent field camps. However, that still leaves Eu806.

Our interpretation of all this is that during Middle Archaic times, the Mt. Hope area was exploited using Strategy 3. People came from some distance away and lived in temporary field camps while they moved about the countryside. On occasion, however, conditions in the area of their prime base camps deteriorated, forcing the group(s) to relocate, if only temporarily, to an alternate base camp. According to Thomas (1983), such alternate camps were frequently located outside the foraging radius but within the logistical radius. The Middle Archaic base camps recorded in the Mt. Hope area may have served in this capacity. This would explain their limited number and generally small size.

The Late Archaic and Numic adaptations appear similar, both reflecting a pattern typical of Strategy 3; the same pattern as perceived in the Middle Archaic data. One difference between these later adaptations and the Middle Archaic is the relative mix of field camps and locations. During Middle Archaic times, locations far outnumber field camps. During the Late Archaic and Numic, however, the two site types are equally abundant, suggesting that field camps may have been occupied for only a short period of time, which allowed for the use of fewer locations.

Subsistence and settlement in the Mt. Hope area seems, then, to fall into two patterns. Up to and including the Early Archaic Phase, this upland area was exploited through foraging on an infrequent basis. Beginning with the Middle Archaic Phase, however, far greater use was made of the upland areas with logistic organization. The abundance of hunting related locations scattered throughout the woods suggests an encounter strategy for hunting (Thomas 1983:41). Other sites (Eu1054, 1011, 989), however, reflect use of an intercept strategy along natural

game trails at places where game could be driven easily. All three are situated in high saddles where two drainages join. At Eu989, it appears that game was driven between large blocks of bedrock. If the features present at Eu793 and 980, both located in Garden Pass Creek Valley, are truly hunting blinds, then they also reflect an intercept strategy.

Use of the area diminishes during the Late Archaic and Numic times and the manner of the logistic exploitation seems to have changed. The shift may be due to changes in the resources which were exploited. Hunting appears to have been a primary activity undertaken in the Mt. Hope area during Middle Archaic times, resulting in a plethora of locations. No similar profusion of hunting locations were employed during the later periods. One possibility is that during the later periods, the area was used not for hunting but pinyon gathering, which would have left far fewer archaeologically recognizable locations.

Ground stone was found at a total of 13 sites. Elko points are present at 25 sites, either alone or with other point types; seven of these (28.0%) have ground stone present. Data from the Rosegate period reflect a similar pattern. Of the 11 sites with Rosegate points, ground stone was found at 3 (27.3%). Desert Side-notched, Gatecliff, and Large Corner-notched points are associated with ground stone but only at multi-component sites that also include Elko points. Ground stone in the Mt. Hope area is most strongly associated with Elko and Rosegate period sites. Clearly, Middle Archaic folks were using the area for more than hunting, and this exploitation was multi-faceted and intensive.

Prehistoric ceramics diagnostic of the late prehistoric or Numic period were found at five field camps and one location. Of these, only two contained projectile points; both contained Late Archaic Rosegate points, and one also had a Middle Archaic Elko component. Cottonwood and Desert Side-notched points, types one would expect to find with ceramics, are not present. Since the sites which contained ceramics are palimpsests, the same precautions apply to their consideration in our analysis of subsistence and settlement systems as for sites with multiple projectile point types as discussed above. If these site type designations are accepted at face value and added into Table 19, the Numic adaptation is characterized by six field camps and two locations. This mixture of types is typical of Strategy 3, but

the predominance of field camps over locations is not in keeping with the logistical character of that strategy.

The presence of Numic period ceramics at sites which lack projectile points characteristic of that period makes us wonder if these sites served some functionally specific role. If so, the Numic components at the six ceramic sites would be more appropriately typed as locations. The mix between site types would then shift to one field camp and seven locations, a blend more appropriate to Strategy 3.

Determinants of Base Camp Location in Pinyon-Juniper Woodlands

Thomas and Bettinger (1976:271-273) provide statistical observations on determinants of base camp location in the Reese River Valley area. A listing of certain recorded variables and their average values is provided in Table 3. Do the base camps in the Mt. Hope project area exhibit similar characteristics to those recorded by Thomas and Bettinger? Review of Table 20 shows that there is considerable consistency between the two data sets. The mean slope values are quite similar. The larger standard deviation for the Mt. Hope sites probably reflects the much smaller size of the data set. Both of the distance measures are lower at Mt. Hope than those in the Reese River Valley. The distance to the pinyon ecotone was not recorded at two sites; Eu790 sits in sage covered Garden Pass Creek Valley and Eu806 sits astride the ecotone. Most of Eu806 is situated atop sage covered hills that look down into pinyon dominated canyons. Some pinyon is also present above the site area.

Elevation above the valley floor was the most difficult variable to measure. Sites Eu809 and Eu815, for example, are located at the upper edges of the gentle-to-moderately sloping valley edge. An estimate of the nearest major break in slope was made using USGS maps and aerial photographs.

Table 20. Base Camp Locational Parameters.

Criterion	Expected Values mean	Expected Values Standard Deviation	Expected Values n	Observed Values mean	Observed Values Standard Deviation	Observed Values n
Slope	8.4%	4.2%	65	7.0%	6.7%	4
Distance to Water	451 m	355 m	65	250 m	300 m	4
Distance to Ecotone	521 m	357 m	65	329 m	16 m	2
Elevation Above Valley Floor	95 m	63 m	65	76 m	32 m	3

In conclusion, it appears that similar base camp locational parameters were operative in the Mt. Hope area as in the Reese River Valley.

HISTORIC RESEARCH CONCERNS

Transportation and Communication

The Pony Express and Overland Stage Route

Survey activites along the suspected route of the Pony Express and Overland Stage route failed to identify any artifacts or sites associated with the period between 1859 and 1869 when the route was in use. Survey activities elsewhere in the project area, however, failed to produce evidence that would suggest our identification of the probable Pony Express route is in error. Even though we did not find hoof prints in the sand, we remain confident that the route described earlier in this report is correct (BLM 1975).

The Eureka and Palisade Railroad

Numerous features were identified along that portion of the Eureka and Palisade Railroad located within the project boundary. By and large, construction materials were restricted to wood, stone, and earth. Very little metal was used, limited to two metal culverts and 1" diameter pipe that appeared in several features. The recorded features exhibit consistency in design and workmanship. In visiting each feature, however, one cannot help but notice unique features. In some cases, there was a greater attention to detail. In others, different techniques

were used to accomplish the same end; e.g., some structural members on a bridge were doweled together, some were notched and fitted together, and others were joined simply with nails or spikes.

It is apparent that by the fall of 1875, many people were involved in constructing the railroad and that matters were proceeding at a smart pace. In such a situation, it is not unlikely that more than one construction crew was assigned to a single task, such as building culverts. When a crew finished one culvert, it moved down the grade to where another was required, bypassing other crews working on other culverts. The archaeological reflection of this would be a slight inconsistency in features, each pattern reflecting the style of an individual work crew. We think that this is the case in the features recorded in the Mt. Hope area.

Another factor that must be kept in mind is that the railroad was in operation, off and on, for 63 years. Surely maintenance activities would have taken place over this period. Of particular interest in this regard is the rejuvenation of the roadbed in 1912. Extensive flooding in 1910 washed out sections of the grade, including at least one section in the project area. As described in the discussion of research concerns, an engine was derailed near Garden Pass due to the washout. Our instinct tells us that Tyrone Creek was the most likely spot for this washout. Some of the uniqueness of features at crossings of Tyrone Creek may reflect 1912 versus 1875 construction techniques.

The two stations in the project area are important for a variety of reasons. First, they are representative of the once numerous stations which existed along the Eureka and Palisade route. The fact that remains of possible structures and a water tower are present at the Summit Station only adds to its importance. Artifact collections at both stations, however, seem to be dominated by artifacts typical of the late 1890s, a period of decline in the history of the railroad. But why would these small stations become more active during this period? Mining in Eureka was in decline, and serious exploration in the Mt. Hope area had not yet begun. A clearer definition of when the stations were most active is a problem which requires further consideration in the future.

No archaeological evidence was found at, or in the immediate area surrounding either station that would suggest the presence of Native Americans. Therefore, it would appear that these stations did not act as foci of habitation for remnant groups of the local Indian population. This is surprising since few Indians would still have been present in the area.

Environmental effects of the railroad on the surrounding area seem to have been limited to the disruption of runoff patterns. We recorded 31 water control features along the 5.5 miles of grade we examined, an average of over 5 per mile. Without walking the entire 90-mile Eureka and Palisade Railroad grade, we cannot say if this figure is normal, exceptionally high, or exceptionally low. If it is normal, then there may be up to 400 such features along the grade within and outside the project area.

Mining

Without inspecting the area surrounding the present Mt. Hope mine, it is difficult to make any definitive statements regarding the history of mining in the area. What our surveys do tell us is that very little mineral exploration has taken place in the Mt. Hope area. What evidence we did find argues against any mining activity during the 1870s or 1880s. If the Leopold district is within the project boundaries, it must be in the area now occupied by the Mt. Hope Mine.

Charcoal Production

Our survey data show that charcoal production occurred at numerous satellite sites located in the vicinities of central Carbonari ranches. These ranches are far more complex than the outlying sites, with evidence of structures, ovens or kilns, corrals, and extensive artifact scatters. The satellite charcoal pit sites, on the other hand, have no structures or features and seldom contain an artifact assemblage of any consequence.

Based on the historic literature and our own archaeological observations, we feel that the stacked wood (and resulting charcoal piles) were eliptical in shape; length and width being dissimilar and the heigth approximating one half the width. The equation for the volume of such a geometric form is:

$$V = 0.5 [1.33 \pi (W/2)^2 (L/2)]$$

where

V = volume
W = width, or the short dimension
L = length, or the long dimension

By using this formula, we can estimate the amount of wood present at the start of the burn based on the size of the resulting (archaeologically visible) charcoal lens. In the field, dimensions of the charcoal piles were recorded in meters. The length and width of each pit inserted into the above equation and the volume of the charcoal calculated. To convert this volume figure into cubic feet, it must be divided by 0.0283. Historic evidence discussed in an earlier section of this report states that one cord of wood (128 cubic feet) yielded 28 bushels (34.8 cubic feet) of charcoal, a reduction in volume of 1 to 3.67. Therefore, to calculate the volume of pinyon, we must multiply the volume of charcoal by 3.67. This provides an estimate of how many cubic feet of wood were present at the start of the burn. Dividing this volume by 128 gives us the number of cords of wood used.

At this point, we are uncertain as to whether the present size of the charcoal piles is a true indicator of the size of the actual charcoal pit. Sacking the charcoal after it cooled, effects of the wind, bioturbation, and water erosion probably resulted in enlarging the piles over time.

Field estimates were made on the size of 43 separate charcoal pits. They averaged 12.7 m long and 9.2 m wide. The average computed number of cords of wood for the pits is 413 ± 524 (n=43). Removing some aberrantly high values, this is reduced to 300 ± 352 cords. These figures are higher than the historically documented estimate of an average pit size of 100 cords. Even a 10% overestimation in the average pit dimensions, however, causes a 27.1% reduction in the number of cords (from 427 to 311 cords). The sites containing these pits are frequently located quite close together. Given their estimated volume, cut pinyon must have been brought to them from a large surrounding area.

Undoubtedly, Carbonari ranches were first established in areas where pinyon was abundant. As the trees in the immediate area around the ranch were exploited, however, the Carbonari had to travel greater distances to get wood for their pits. Given the archaeological distribution of the pits, it appears they preferred to do this rather than to locate pits in remote areas some distance from the ranch. This leads us to suspect that charcoal pits may have been reused and that reuse is the likely cause of the inflated estimates of pit volume.

A research question associated with the effects of charcoal production deals with the distributional limits of pinyon-juniper woodlands. The cutting of pinyon had a devistating effect on the woodlands during the late 1800s (Young, Evans, and Tueller 1976). At issue is whether the present woodland has expanded beyond its early historic boundary, and whether the nature of the woodland has changed at all.

Observations made during our survey of the area sheds some admittedly subjective light on these matters. One "artifact" type left as a result of charcoal production is stumps; a multitude of which were walked around, tripped over, and otherwise observed. Stumps were seldom seen outside the limits of the present pinyon-juniper woodland, and they were as prevalent near its lower edges as in its center. This suggests that in the Mt. Hope area, the present and past (pre-1870) distribution of pinyon woodland is effectively the same. The stumps we saw represent fairly good-sized trees. On a very subjective level, these stumps appear to be more widely spaced than living trees of similar size. If this is a true reflection of the 1870s era woodlands, then pinyon were more widely spaced, and larger on the average than trees present today. This suggests that the pristine pinyon woodland was more open, comprised mainly of large, mature trees, and that it was maintained in this form by range fires.

Ethnic Populations

The Italians

Although we looked at numerous charcoal production sites which we assume were occupied by ethnic Italians, we did not observe any evidence that conclusively documents this presence. In many respects, this is no great surprise. Unlike the Chinese,

immigrant Italians came to the New Country to stay. They readily adapted to local technological and commercial situations and retained little of an artifactual nature that would allow their ethnicity to be identified archaeologically. Satisfactory resolution of the research concerns regarding the Italian presence in the area may only be possible through recovery of data using excavation and intensive surface collection techniques. Our survey only served to identify sites at which such activities are most likely to produce meaningful results.

The Chinese

Four sites were recorded during the survey that contain Chinese artifacts. Isolate 1 of Eu787 consisted of fragments of an isolated Chinese bowl found adjacent to the railroad grade. One site (Eu998) includes an opium tin in association with a variety of other artifact types, and the site's association with ethnic Chinese is at best uncertain.

The remaining two sites are of substance. Eu790, recorded during the Class II survey, is situated close to the Eureka and Palisade railroad and may have been a temporary work camp occupied in the fall of 1875 when the railroad was constructed through Garden Pass Creek Valley (James and Elston 1983:65); artifacts present are typical of that period.

Feature B of Eu787 is quite small in area but contains a wide variety of material. Of most interest is that structures were present at what gives every appearance of having been a residential site. This being the case, the site may post-date the period of railroad construction.

Based on these observations, we can provide preliminary answers to certain of our research questions. Chinese involvement in constructing the railroad is clearly evident. Further, it appears that a continued Chinese presence in the area can be demonstrated at Feature B of Eu787. Bowers and Muessig (1982:64) document that some Chinese laborers did live near and work at small isolated railroad stations. Perhaps that is what we are seeing at Feature B.

No artifacts were found at any of the charcoal production sites that would lead us to suspect that Chinese were present at those places.

CULTURAL RESOURCES MANAGEMENT RECOMMENDATIONS

The management of cultural resources consists of several steps which are integrated into a specific manner of inquiry. The process is designed to provide appropriate levels of planning information to the project planning team at various stages of project development. The major segements of this process include:

1. identification of sites within the area of the project's sphere of potential impact;
2. evaluation of the identified sites to determine which, if any, are eligible for nomination to the National Register of Historic Places (this step frequently requires limited test excavations at some sites);
3. determination of the level of direct and indirect impacts upon the identified sites with an emphasis on sites which are National Register eligible;
4. attempt to avoid impacts to significant sites via negotiation regarding project modification between the project developer and appropriate reviewing agencies (ie., the Bureau of Land Management, the State Historic Preservation Officer, and the President's Advisory Council on Historic Preservation); and,
5. as necessary, mitigation of adverse effects to specific sites identified as a result of the above process.

With the exception of the highway relocation, the historic Mt. Hope Mine, and as yet unspecified project related rights-of-ways and facilities, the first step of this process is now complete for EMC's Mt. Hope Project. The purpose of this chapter is to evaluate the sites discovered to date with regard to their potential National Register eligibility (called for in the second step) and provide recommendations regarding additional levels of information necessary to the remaining three steps.

In January 1984, EMC brought to our attention that the project area has been reduced in size. The relationship of the original study area and the amended project boundary is shown in Figure 20 along with areas of direct impact relating to proposed mine operations (excavation, tailings ponds, and waste disposal areas). While our National Register eligibility assessment addresses all sites recorded during field work in the original project area, management recommendations are confined to sites within the amended project area.

NATIONAL REGISTER CONSIDERATIONS

Sites recorded during the Class II and Class III phases of field survey work were assessed to determine which, if any, are potentially eligible to the National Register of Historic Places. Criteria employed in this evaluation are discussed in the chapter dealing with research methods. It should be noted that all statements regarding site eligibility are based on field observations of surface manifestations; no subsurface testing has been undertaken to date. It became apparent while we were in the field that assessment can make use of the district and/or thematic approaches to National Register eligibility. A district consists of numerous sites closely associated with one another in both theme and physical proximity. The thematic approach groups sites related to one another in a clearly thematic way, but which may not physically adjoin one another.

In our estimation, twenty-eight sites in the study area are eligible for nomination to the National Register (11 outside the project boundary, 17 within the project boundary). The cluster of large Middle Archaic prehistoric base and field camps located to the west and southwest of Mt. Hope are a prime candidate for consideration as a district nomination. Included in this cluster are sites Eu806, Eu1011, Eu1015, Eu1022, Eu1026, Eu1027, Eu1040, and Eu1054 (only Eu1011 is within the project boundary, the remainder are outside the project boundary). These sites retain substantial integrity and an abundance of significant data.

As discussed in our analysis of the site data, three types of prehistoric field camp are present in the project area. Type C field camps are the most enigmatic due to their distinct distributional patterning; all are situated around the margins of Garden Pass Creek valley. We feel this group of sites is distinctive enough to warrant further National Register eligibility consideration. Rather than evaluate all six sites of this type, we suggest that attention be focused on sites Eu810 and Eu1056, due to their higher artifact content and ease of access. Both are located along a road between the project area and Alternate Site J, and are outside the project boundary. Of particular interest is information that may help explain the cause of the very distinct distributional pattern, possibly in terms of subsistence activities.

The role basalt played in the Middle Archaic period sites at Mt. Hope is an important research issue. As mentioned, basalt use is thought to date to a much earlier chronological period. Given the rarity of sites with basalt in the study area, and the frequent use of basalt in the manufacturing of large chopping and scraping tools, the sites with basalt artifacts deserves further National Register eligibility consideration. We propose that attention be focused on two sites: Eu788, which contains basalt tools and abundant basalt debitage; and Eu983, which contains several large scrapers and choppers.

Ceramic-bearing sites in the area also deserve further attention. Of the six sites in the study area with ceramics, all are located in or adjacent to the pinyon-juniper woodlands, a pattern also noticed by Thomas (1970:697) in the Reese River Valley. Ceramic sites in nearby Grass Valley, however, are more frequent in the valley bottom (Beck 1981:13). Sites with pottery in the Mt. Hope area did not contain projectile points typical of the Late Prehistoric, Yankee Blade phase (points were present but date to earlier chronological periods). We suggested that ceramic sites may have served a functionally specific role, but what role? Of the six sites, Eu986 (inside the project boundary) and Eu1056 (outside the project boundary) contain the most data and may contain residential and subsistence information. In our estimation, these sites deserve further National Register eligibility consideration.

James and Elston (1983:45) discuss how seldom pinyon caches are recorded by archaeologists. This suggests that the feature which we assume to have been a pinyon cache (Eu982) may be a highly unique find, a fact that would enhance its potential National Register eligibility. We feel that it would be prudent to test this feature in order to determine if it truly is a pinyon cache and thus significant in National Register terms.

Historic charcoal production in the Mt. Hope area is an appropriate subject for a thematic National Register nomination. Vital elements that need to be included within such a nomination include evidence of various types of charcoal production techniques, collier residential patterns, and transportation networks. We propose that sites Eu800, Eu923, Eu924, Eu925, Eu931, Eu987, Eu988, Eu991, Eu993, Eu994, and Eu1042 be considered for inclusion in this thematic grouping. In our opinion, this group of sites represents the nature of charcoal

production in the Mt. Hope area. Sites Eu800, Eu988, and Eu1042 appear to be Carbonari Ranches; major residential sites that served as the hub of charcoal production in their respective locales. The remainder are charcoal pits centered around Eu988. Sites Eu800 and Eu1042 are located outside the project boundary, the remainder are within the boundary.

Our recommendations regarding the Eureka and Palisade Railroad are based on the assumption that the segment of the route within the project area is representative of the whole. We recorded two stations and numerous features and isolates associated with the railroad. Given the assumption of representativeness, we do not believe that the isolates or the features are eligible for nomination to the National Register on an individual basis. Of the two stations, Summit is the most substantial. What appear to be the traces of structures are present and the abundance and diversity of artifacts present is higher than at the Garden Pass Station. Given its proximity to the highway and the presence of a recent structure, we feel that the area of the Garden Pass Station has been heavily collected. Summit Station, on the other hand, retains more of its integrity. We consider the Summit Station eligible for nomination to the National Register.

As mentioned previously, no sites associated with the Pony Express and Overland Stage route were identified during either the Class II or the Class III survey efforts in the Mt. Hope area. All that remains is the roadway along which we presume riders and stages traveled, a roadway that has been in regular use to the present. In the absence of any artifacts, stage stops, or sites that clearly reflect the period, we feel that the section of the route within the project area is not eligible for nomination to the National Register.

Evidence of the Eureka-to-Palisade Stage and Freight route within the project area consisted of faint roadway traces and a limited number of small artifact scatters or isolates. While roadways such as this are of interest, they are common. National Register designation of such routes should, we feel, focus on segments associated with areas of higher site concentration (stage stops or the Hay Ranch in Pine Valley, for example) and integrity of setting. Therefore, we do not feel that the section of roadway in the project area, or its related artifacts, are eligible for nomination to the National Register.

Two sites (Eu790 and Feature B of Eu787) were identified that have major Chinese components. Our preliminary analysis of these sites is that Eu790 was a short-term workcamp occupied by Chinese laborers involved in construction of the Eureka and Palisade Railroad, while Feature B of Eu787 was a more permanent residence. The Chinese occupants of this site may have been employed by the railroad and assigned to either the Summit or the Garden Pass station (the site lies equidistant between the two camps). In our opinion, Feature B of Eu787 is eligible for nomination to the National Register, but Eu790 requires further evaluation before its eligibility can be fully determined.

The National Register significance discussion presented above is summarized in Table 21 and the distribution of eligible and potentially eligible sites is presented in Figure 20.

PROPOSED TESTING AND EVALUATION ACTIONS

Figure 20 reveals that 11 sites which we consider eligible for nomination to the National Register, or which deserve further evaluation, are located outside the amended project boundary while 17 are within the boundary. Twelve of the latter exhibit sufficient integrity and significance to be considered eligible for nomination to the National Register; five require further evaluation in the form of testing before a final determination of eligibility can be made.

Within the project boundaries, Sites Eu788, Eu790, Eu982, Eu983, and Eu986 require testing to determine their National Register eligibility and their potential for addressing specific research questions. Testing activities at each site should include the development of detailed maps which will allow for firm determination of site size, location of artifact concentrations, and understanding of minor topographic details that may have played a part in site formation; limited, but controlled, surface collections to determine the amount and variety of materials present; and test excavations to determine if subsurface components are present. Surface collection must be undertaken in a systematic manner in order to estimate the total artifact content of the site and to gauge the significance of the data in addressing particular research questions. We propose that linear transects divided into 1 m units be employed. This will allow for the definition of artifact concentrations likely to represent individual households or higher level socio-

Table 21. Sites Eligible or Potentially Eligible to the National Register.

Site Number	Description	Eligibility Status	Relationship To Project Boundary	Proposed Next Action
26Eu806		Eligible	Outside	None Proposed
26Eu1011		Eligible	Inside	Mitigation
26Eu1015	Middle	Eligible	Outside	None Proposed
26Eu1022	Archaic	Eligible	Outside	None Proposed
26Eu1026	Field	Eligible	Outside	None Proposed
26Eu1027	Camps	Eligible	Outside	None Proposed
26Eu1040		Eligible	Outside	None Proposed
26Eu1054		Eligible	Outside	None Proposed
26Eu810	Type C	Potent. Eligible	Outside	None Proposed
26Eu1056	Field Camps	Potent. Eligible	Outside	None Proposed
26Eu986	Ceramic	Potent. Eligible	Inside	Testing
26Eu1056	Bearing	Potent. Eligible	Outside	None Proposed
26Eu982	Cache	Potent. Eligible	Inside	Testing
26Eu788	Basalt Site	Potent. Eligible	Inside	Testing
26Eu983	Basalt Site	Potent. Eligible	Inside	Testing
26Eu800	Charcoal Ranch	Eligible	Outside	None Proposed
26Eu923	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu924	Charcoal Pit	Eligible	Inside	Mitigation
26Eu925	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu931	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu987	Charcoal Pit	Eligible	Inside	Mitigation
26Eu988	Charcoal Ranch	Eligible	Inside	Mitigation
26Eu991	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu993	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu994	Charcoal Pit	Eligible	Inside	None Proposed *
26Eu1042	Charcoal Ranch	Eligible	Outside	None Proposed
26Eu787:				
Fea. II	Summit Station	Eligible	Inside	Mitigation
Fea. B	Chinese Site	Eligible	Inside	Mitigation
26Eu790	Chinese Site	Potent. Eligible	Inside	Testing

* Pending results of other testing activites.

behavioral units. Between two and four such transects, oriented through the length and width of each site, should be examined. Subsurface testing at each site should include the hand excavation of an area with a maximum size of two square meters.

It may be prudent to further evaluate those sites we presently consider eligible for nomination to the National Register since mitigation may be required at many (if not all). Testing activities would allow the research potential of these sites and subsequent mitigation recommendations to be refined. Testing activites similar to those described above should be undertaken at sites Eu787 (Features B and II), Eu988, and Eu1011. In addition, we recommend that two charcoal pits (Eu924 and Eu987) be trench tested, the purpose of which is two fold: cutting a backhoe trench across each pit will allow us to determine their depth and profile, while a careful examination of the trench sidewalls will allow us to determine their potential for containing historic artifacts. These and additional charcoal pits may require future attention if trench testing reveals significant deposits.

Upon completion of all testing activities, a report should be prepared detailing their results. A vital part of this report must be a final recommendation on the National Register eligibility of the tested sites, as necessary, and a clarification of identified mitigative actions.

Testing and mitigation are most frequently conducted as separate activites, the scale and direction of mitigation depending on testing results. However, if the anticipated level of mitigation is low, it may be possible to conduct both the testing and mitigation steps during a single field session. Such a condensed program would require considerable planning, consultation, and coordination before and during field activities.

REFERENCES CITED

Advisory Council on Historic Preservation
1979 Guidelines for implementing 36CFR Part 800, protection of historic and cultural properties. Advisory Council on Historic Preservation, Washington, D.C.

Bancroft, Herbert H.
1890 *History of Nevada, 1540-1888*. The History Company, San Francisco. Reprinted 1981, with an introduction by Jerome E. Edwards. Nevada Publications, Las Vegas.

Beck, Colleen M.
1981 Shoshoni brownware from Grass Valley, Nevada. *Annals of Carnegie Museum* Vol. 50. Pittsburgh, Pennsylvania.

Bedwell, S. F.
1973 *Fort Rock Basin Prehistory and Environment*. University of Oregon Books, Eugene.

Berge, Dale L.
1980 Simpson Springs Station historical archaeology in western Utah 1974-975. *Bureau of Land Management, Utah, Cultural Resource Series* No. 6.

Binford, Lewis R.
1978 Dimensional analysis of behavior and site structure: learning from an Eskimo hunting stand. *American Antiquity*, 43(3):330-361.

1980 Willow smoke and dogs' tails: hunter-gatherer settlement systems and archaeological site formation. *American Antiquite* 45(1):4-20.

1982 The archaeology of place. Journal of Anthropological Archaeology, 1(1):5-31.

Bowers, Martha H., and Hans Muessig
1982 History of central Nevada: an overview of the Battle Mountain District. *Bureau of Land Management Cultural Resources Series* No. 4. Reno.

Bryan, Alan L.
1979 Smith Creek Cave. In The archaeology of Smith Creek Canyon, eastern Nevada, Donald R. Tuohy and Doris L. Rendall (eds.). *Nevada State Museum Anthropological Papers* 17. Carson City, Nevada.

Bureau of Land Management
1975 *Nevada Pony Express Route: Historic Digest and Interim Recreation Plan*. Carson City, Nevada.

1982 Cultural Resources Survey: General Guidelines. Reno, Nevada.

Carter, Gregg
1975 Social demography of the Chinese in Nevada: 1870-1880. Nevada Historical Society Quarterly 18(2):91-106.

Clewlow, C. William, Jr. and Allen G. Pastron
1972 Preliminary investigations. In, The Grass Valley Archeological Project: Collected Papers, edited by C. William Clewlow Jr. and Mary Rusco. Nevada Archeological Survey Research Paper No. 3:11-32. University of Nevada, Reno.

Coale, George L.
1963 A study of Shoshonean pottery. Tebiwa 6(2):1-11.

Creel, C.W.
1964 A History of Nevada Agriculture. College of Agriculture, University of Nevada. Reno.

Davis, E. L. (editor)
1978 The Ancient Californians: Rancholabrean Hunters of the Mojave Lakes Country. Natural History Museum of Los Angeles County: Science Series 29.

Department of the Interior
1880 Statistics of the Population of the United States at the Tenth Census. Census Office. Washington, D. C.

Earl, Phillip
1969 Nevada's Italian war. Nevada Historical Society Quarterly 12(2):47-87.

Edaburn, Sharon
1982 The historic study unit: Mining and industrial activities. In An Archaeological Element for the Nevada Historic Preservation Plan, edited by Margaret M. Lyneis, pp. 208-223. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Elston, Robert G.
1979 The archeology of U.S. 395 right-of-way between Stead, Nevada and Hallelujah Junction, California. Report submitted to the California Department of Transportation (CalTrans) and the Nevada Department of Highways by the Nevada Archeological Survey, University of Nevada, Reno. On file at CalTrans, Nevada Department of Highways and Special Collections, Getchell Library, University of Nevada, Reno.

1982 Good times, hard times: prehistoric culture change in the westen Great Basin. In Man and environment in the Great Basin, edited by J. F. O'Connell and D. B. Madsen. Society for American Archaeology, Paper 2.

Elston, Robert G.
1983 Gund Ranch cultural resource research and preservation program: phase III. Report submitted to the Nevada State Division of Historic Preservation and Archaeology. Prepared by Agricultural Experiment Station, Max C. Fleischmann College of Agriculture, University of Nevada. Reno.

Elston, Robert G., Jonathan O. Davis, Alan Leventhal, and Cameron Covington
1977 The prehistory of the Tahoe Reach of the Truckee River. Prepared by Northern Division of the Nevada Archaeological Survey, University of Nevada, Reno, for Tahoe-Truckee Sanitation Agency.

Elston, Robert G., J. O. Davis, and Robert Clerico
in press 26Ny1908; a late Pleistocene gravel bar in Railroad Valley, Nevada. Ms. in preparation Social Sciences Center *Technical Report*, Desert Research Institute, University of Nevada, Reno.

Elston, Robert G., Donald Hardesty, and Sheryl Clerico
1981 Archaeological investigations on the Hopkins Land Exchange. Report prepared by Intermountain Research on file at USDA Forest Service, Tahoe National Forest, Nevada City, California.

Elston, Robert G., Donald Hardesty, and Charles Zeier
1982 Archaeological investigations on the Hopkins Land Exchange, Vol. II: an analysis of archaeological and historical data recovered from selected sites. IMR Report #395 prepared for U.S. Forest Service, Nevada City, California.

Glassow, M. A.
1977 Issues in evaluating the significance of archeological resources. *American Antiquity* 42:413-420.

Gould, R. A.
1980 *Living Archaeology*. Cambridge University Press. Cambridge.

Grazeola, Franklin
1969 The charcoal burner's war of 1879: A study of the Italian immigrant in Nevada. MA Thesis, University of Nevada, Reno.

Greenwood, Roberta S.
1980 *The Changing Faces of Main Street*. University Microfilms International. Ann Arbor.

Hanes, Richard, and Sam Ball
1982 The central Nevada study unit. In *An Archaeological Element for the Nevada Historic Preservation Plan*, edited by Margaret M. Lyneis, pp. 93-122. Nevada

Division of Historic Preservation and Archaeology, Carson City, Nevada.

Hardesty, Donald
1982 The historic study unit: Farming/ranching activities. In An Archaeological Element for the Nevada Historic Preservation Plan, edited by Margaret M. Lyneis, pp. 208-223. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Heizer, R. F., and M. A. Baumhoff
1970 Big-game hunters in the Great Basin: a critical review of evidence. Contributions of the University of California Archaeological Research Facility No. 7, pp. 1-12. Berkeley.

Herskovitz, Robert M.
1978 Fort Bowie material culture. Anthropological Papers of the University of Arizona Number 31. The University of Arizona Press, Tuscon.

Holmer, Richard, and Joel Janetsky
1980 M-X cultural resources studies regional cultural resources survey, Area C. Report prepared for HDR, Sciences, Santa Barbara, California.

James, Steven R. and Robert G. Elston
1983 A class II archaeological survey in the Mt. Hope vicinity, Eureka County, Nevada. Report prepared for Exxon Minerals Corporation, Houston, Texas. Ms. on file Intermountain Research, Silver City, Nevada.

James, Steven R., and Charles D. Zeier
1982 Eastern Nevada study unit. In An Archaeological Element for the Nevada Historic Preservation Plan, edited by Margaret M. Lyneis, pp. 123-159. Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada.

Jochim, Michael A.
1976 Hunter-gatherer Subsistence and Settlement: A Model. Academic Press, New york.

Kelly, Robert L.
1980 Long-term hunter-gatherer adaptation and aquatic resource exploitation in the Great Basin. Paper presented at the 1980 Great Basin Anthropological Conference, Salt Lake City.

Kneiss, Gilbert H.
1963 Bonanza Railroads. Stanford University Press. Stanford, California.

Layton, Thomas
1970 High rock archaeology: an interpretation of the prehistory of the northwestern Great Basin. Ph.D. dissertation. Harvard University, Cambridge.

Lyneis, Margaret (coordinator)
1982 *An Archaeological Element for the Nevada Historic Preservation Plan.* Prepared for Nevada Division of Historic Preservation and Archaeology, Carson City, Nevada, by the University of Nevada, Las Vegas.

Madsen, David B.
1982 Get it where the gettin's good: a variable model of Great Basin subsistence and settlement based on data from the eastern Great Basin. In, Man and Environment in the Great Basin. *Society for American Archaeology Paper* No. 2, edited by David B. Madsen and James F. O'Connell. Washington, D.C.

Madsen, Rex
1977 Prehistoric ceramics of the Fremont. *Museum of Northern Arizona Ceramic Series* 6.

Mordy, Brooke D., and Donald L. McCaughey
1968 Nevada historical sites. Western Studies Center, Desert Research Institute, University of Nevada. Reno.

Muto, Guy Roger
1971 A technological analysis of the early stages in the manufacture of lithic artifacts. MA thesis, Idaho State University, Pocatello.

Myrick, David F.
1962 *Railroads of Nevada and Eastern California* (Vol. I). Howell-North Books, Berkeley.

Murbarger, Nell
1965 Forgotten industry of the frontier. *Frontier Times* 39(3):26-27, 58-60.

National Park Service
1982 *How to Apply the National Register Criteria for Evaluation.* National Park Service, Washington, D. C.

Nevada State Legislature
1979 Report of the State Minerologist. *Appendix to the Journals of the Senate and Assembly*, sixth session. Carson City, Nevada.

O'Connell, James F.
1977 Room to move: contemporary Alawara settlement patterns and their implications for aboriginal housing policy. *Mankind* 11:119-31.

Pendleton, Lorann S.
1979 Lithic technology in early Nevada assemblages. MA Thesis, California State University, Long Beach.

Praetzellis, Adrian and Mary Praetzellis
1979 The Lovelock Ceramics. In, Eugene M. Hattori, Mary K. Rusco and Donald R. Tuohy, eds., Archaeological and Historical Studies at Ninth and Amherst, Lovelock, Nevada, Part Three: Archaeological artifacts and other specimens from Ninth and Amherst. Nevada State Museum, Carson City.

Reichman, Fredrick
1967 Early history of Eureka County, Nevada, 1863-1890. MA Thesis, University of Nevada, Reno.

Rock, Jim
1980a American Bottles: A Few Basics. Klamath National Forest, Region 5, USDA.

1980b Tin Cans: A Few Basics. Klamath National Forest, Region 5, USDA.

Sawyer, B.W.
1971 Nevada Nomads. Harlan-Young Press. San Jose.

Shepard, Anna O.
1976 Ceramics for the archaeologist. Carnegie Institution of Washington Publication 609. Washington, D.C.

Shepperson, Wilbur S.
1970 Restless Strangers: Nevada's Immigrants and Their Interpreters. University of Nevada Press. Reno, Nevada.

South, Stanley
1977 Method and Theory in Historical Archaeology. Academic Press, New York.

Steward, J. H.
1938 Basin-Plateau aboriginal sociopolitical groups. Bureau of American Ethnology Bulletin 120.

1941 Culture element distributions: XIII, Nevada Shoshone. University of California Anthropological Records No. 4. Pp. 209-359. Berkeley.

Thomas, D. H.
1970 Review of: Archeological survey in eastern Nevada and The archeology of Newark Cave, White Pine County, Nevada by D. Fowler. American Anthropology 72:696-697.

Thomas, D. H.

1971 Prehistoric subsistence-settlement pattern of the Reese River Valley, central Nevada. Ph.D. dissertation, University of California, Davis. Reprint: University Microfilms, Ann Arbor.

1972 Western Shoshone ecology: settlement patterns and beyond. In Great Basin cultural ecology: a symposium, Don D. Fowler, editor. *Desert Research Institute Publications in the Social Sciences*, No. 8. Reno.

1973 An empirical test for Steward's model of Great Basin settlement patterns. *American Antiquity* 27(1):71-81.

1981 How to classify the projectile points from Monitor Valley, Nevada. *Journal of California and Great Basin Anthropology* 3(1):7-43.

1982 The archaeology of Gatecliff Shelter and Monitor Valley (4 vols.). *Anthropological Papers of the American Museum of Natural History*. New York (in press)

1983 The archaeology of Minotor Valley: 1. Epistemology. *Anthropological Papers of the American Museum of Natural History* 58(1). New York.

Thomas, D. H., and Robert L. Bettinger

1976 Prehistoric piñon ecotone settlements of the Upper Reese Valley, central Nevada. *American Museum of Natural History Anthropological Papers* 53(3).

Thompson, Thomas H., and Albert A. West

1881 *History of Nevada*. 1958 Reproduction, Howell-North. Berkeley, California.

Tuohy, D. R.

1956 Shoshoniware from Idaho. *Davidson Journal of Anthropology* 2(1):55-71.

1968 Some early lithic sites in western Nevada. In *Early Man in Western North America*, C. Irwin-Williams, ed. Contributions in Anthropology, Vol 1(4). Portales, New Mexico.

1974 A comparative study of late Paleo-Indian manifestations in the western Great Basin. *Nevada Archaeological Survey Research Paper* No. 5, pp. 91-116. Reno.

Yellen, John E.

1977 *Archeological Approaches to the Present*. Academic Press. New York.

York, Robert

1974 Test excavations and controlled surface collecting in Long Valley, Nevada. In partial fulfillment of

requirements for federal antiquities permit. Nevada State Museum, Carson City, Nevada.

Young, James A., and Jerry D. Budy
1979 Historic use of Nevada's pinyon-juniper woodlands. Journal of Forest History 23:113-121.

Young, James A., Raymond A. Evans, and Paul T. Tueller
1976 Great Basin plant communities--pristine and grazed. In Holocene environmental change in the Great Basin, Robert Elston, editor. Nevada Archeological Survey Research Paper No. 6. University of Nevada, Reno.

Zeier, Charles D.
1981 The White Pine power project: Cultural resource considerations, volume I. A culture history overview and predictive model for the existence of cultural resources in White Pine County, Nevada. Intermountain Research Reports; prepared for Dames & Moore, Los Angeles. Ms. on file, Bureau of Land Management, Ely District Office.

APPENDIX A

BLM Memo of July 11, 1983

CULTURAL RESOURCES REPORT

BLM 6-467(P)

Project: A class II Archaeological Survey in the Mount Hope vicinity, Eureka County, Nevada.

Contractor: Intermountain Research

Summary of Recommendations:

1. Class III surveys are recommended for only portions of the subject area. These are:
   a. Highway reroute as finalized.
   b. The following ridges:
      1. T. 22 N., R. 52 E., Section 18, W½.
      2. T. 22 N., R. 51 E., Section 11, SE¼; Section 12, S½; Section 13, all; Section 14, E½.
      3. T. 22 N., R. 51½ E., Section 13, S½, S½N½.
   c. Shore line areas in Site I.

      T. 22 N., R. 53 E., Section 19, SW¼; Section 14, W½, NW¼.
   d. Sample every 4th through 1st order drainage in the Mine Area, Site B exclusive of the crested wheat seedings and Site J. Sample size to be based on how many of these drainages exist.
   e. 100-meter wide corridor centered on each of the historic roads.
   f. 100-meter wide corridor centered on the Pony Express/Overland Trail.
   g. 200-meter wide corridor centered on the Eureka-Palisades Railroad.
   h. Area of the historic Mount Hope Mine.
2. Using aerial photograph, identify probable charcoal production areas within the subject lands and field check these areas.
3. Evaluate a sample of sites recorded by the Class II survey and the above recommended work by controlled surface collection samples and subsurface testing in order to determine National Register eligibility.

4. Mitigation recommendations will be based on evaluation of data generated by the Class II Survey, plus the above recommended work.

Reviewed by: Roberta L. McGonagle Date: 7/11/83
District Archaeologist

Approved by: Neil D. Talbot Date: 7/11/83
Area Manager

APPENDIX B

Summary of Prehistoric and Historic Sites Recorded During the Mt. Hope Survey Phases I and II

Summary of Prehistoric Sites Recorded During the Class II Survey of the Project Area

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26EU783	6440	Sagebrush	Location	Isolates	----	Biface; chert flake
26EU785	6904	P-J	Location	Isolate	----	Point fragment
26EU788	6560	P-J	Field Camp	8400	Archaic/ Numic	Elko and Desert Side-notched point, biface, mano stone circles(?); chert, obsidian, basalt flakes
26EU789	6660	P-J	Location	Isolate	----	Chert flake
26EU790*	6200	Sagebrush	Base Camp	4600	Archaic	Elko Eared point; biface, core, flakes
26EU793	6040	Sagebrush	Location	4	----	Rock circle, flake
26EU795	6400	P-J	Location	Isolate	----	Utilized Flake
26EU797	6520	P-J	Location	225	Archaic	Elko(?) point, chert flakes
26EU801	6700	P-J/Sage	Location	1800	----	Basalt chopper and core; chert, obsidian, basalt flakes
26EU802	6700	P-J	Location	Isolate	----	Isolated basalt biface
26EU803	6540	P-J/Sage	Location	2	----	Chert flakes
26EU805	6660	P-J	Location	Isolate	----	Biface fragment
26EU806	7040	P-J	Base Camp	32,000	Archaic	Elko point frags, bifaces, chert flake
26EU807	7160	P-J	Location	400(?)	----	Chert flakes
26EU808	6950	P-J	Location	100(?)	----	Chert flakes
26EU809*	6960	P-J	Base Camp	4500	Archaic	Corner-notched arrow point, point fragments, drill, scraper, utilized flake, chert flakes
26EU810*	6720	P-J	Field Camp	1000	Archaic/ Numic	Rosegate series and Desert Side-notched points, point fragment, biface fragment, drill fragments, chert flakes
26EU812	6880	P-J	Location	Isolates	----	Chert and rhyolite flake
26EU814	6210	Sagebrush	Location	25	----	Chert flakes
26EU815	6830	P-J	Base Camp	1225	Archaic	Elko points, point fragment, bifaces, core, chert and basalt flakes
26EU820	6880	P-J	Location	Isolates	----	Chert and quartzite flake
26EU821	6980	P-J	Location	?	----	Chert flakes
26EU822	6980	P-J	Location	?	Archaic	Drill/corner-notched point fragment, chert flakes
26EU826	6540	P-J	Location	Isolate	----	Point tip fragment
26EU829	6240	Sagebrush	Location	Isolate	----	Chert flake
26EU830	6200	Sagebrush	Location	Isolate	Archaic	Elko point
26EU832	6160	Sagebrush	Location	Isolate	Archaic	Elko point
26EU833	6520	P-J	Location	Isolate	Archaic	Elko point
26EU834	6520	P-J	Field Camp	1600	----	Shoshonean ceramics, point blank and tip fragments, biface, utilized flake, chert flakes
26EU835	6440	P-J	Field Camp	1200	----	Metate fragments; biface; chert, quartzite, and obsidian flakes; hearths/roasting areas (?)

* Site also has historic component

Summary of Prehistoric Sites Recorded During the Class III Mt. Hope Survey

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26Eu874	7160	Big Sage	Location	isolate	unknown	Secondary flake
26Eu876	7340	Big Sage	Location	isolate	unknown	Mano
26Eu879	6960	Big Sage	Location	isolate	unknown	Five chert flakes
26Eu882	7300	P-J	Location	isolate	unknown	Point midsection, utilized flake
26Eu885	6730	J-Sage	Location	isolate	unknown	white chert flake
26Eu886	6780	J-Sage	Location	isolate	Middle Archaic	Elko point
26Eu888	6740	Big Sage	Location	isolate	unknown	Fused shale flake
26Eu891	6760	J-Sage	Location	isolate	unknown	Six biface thinning flakes
26Eu892	6760	J-Sage	Location	isolate	unknown	One white chert secondary flake
26Eu893	6790	J-Sage	Location	isolate	unknown	One white chert secondary flake
26Eu896	6730	P-J	Location	isolate	unknown	Chert point tip
26Eu897	6770	P-J	Location	isolate	unknown	Battered chert biface
26Eu899	6680	P-J	Location	isolate	unknown	Biface reduction flake
26Eu900	6710	P-J	Location	isolate	unknown	Five grey chert flakes
26Eu901	6740	J-Sage	Location	isolate	unknown	Grey chert nodule
26Eu902	6970	P-J	Location	isolate	Early Archaic	Gatecliff point
26Eu906	6960	J-Sage	Location	isolate	unknown	Unidentified point frag.
26Eu907	6880	J-Sage	Location	isolate	unknown	Unidentified point frag.
26Eu908	6880	J-Sage	Location	isolate	unknown	Chert secondary flake
26Eu911	6820	J-Sage	Location	isolate	Middle Archaic	Elko point
26Eu913	6740	P-J	Location	isolate	unknown	Three chert flakes
26Eu915	6870	J-Sage	Location	isolate	unknown	Two flakes, scraper
26Eu916	6870	J-Sage	Location	isolate	unknown	Two flakes, scraper
26Eu917	6720	J-Sage	Location	isolate	unknown	Two biface thinning flakes
26Eu919	6500	P-J	Location	isolate	unknown	Point fragment
26Eu920	6450	J-Sage	Location	isolate	unknown	2 secondary flakes
26Eu922	6500	J-Sage	Location	isolate	unknown	White chert flake
26Eu929	6615	P-J	Location	isolate	unknown	Modified chert flake
26Eu930	6620	P-J	Location	isolate	unknown	Biface fragment
26Eu932	6600	P-J	Location	isolate	unknown	Unidentified point frag.
26Eu933	6540	P-J	Location	isolate	unknown	White chert flake
26Eu934	6490	P-J	Location	isolate	unknown	Biface reduction flake
26Eu936 *	6420	J-Sage	Location	isolate	unknown	Two flakes
26Eu938	6380	P-J	Location	isolate	unknown	Two flakes
26Eu941	6350	J-Sage	Location	isolate	unknown	Chalcedony flake
26Eu946	6210	Big Sage	Location	isolate	unknown	Biface reduction flake
26Eu948	6160	Big Sage	Location	isolate	unknown	Utilized assay flake
26Eu949	6350	J-Sage	Location	isolate	unknown	White chert flake
26Eu950	6280	J-Sage	Location	isolate	unknown	Unidentified point frag.
26Eu951	6285	J-Sage	Location	isolate	unknown	Point tip
26Eu955	6560	J-Sage	Location	isolate	unknown	Scraper fragment
26Eu956	6470	P-J	Location	isolate	unknown	Unidentified point frag.
26Eu958	6280	Big Sage	Location	isolate	unknown	Retouched flake
26Eu959	6240	Big Sage	Location	isolate	unknown	Chert biface frag.
26Eu960	6280	Big Sage	Location	isolate	Late Archaic	Desert Side-notched point, flake
26Eu961	6350	J-Sage	Location	isolate	unknown	Biface fragment

* Site also has historic component

Summary of Prehistoric Sites Recorded During the Class III Mt. Hope Survey (cont'd.)

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26Eu966	6490	J-Sage	Location	isolate	unknown	Secondary flake
26Eu970	6680	J-Sage	Location	isolate	unknown	Decortification flake
26Eu972	6600	J-Sage	Location	isolate	unknown	Biface frag & 4 flakes
26Eu976	6730	P-J	Location	isolate	unknown	Point midsection
26Eu979 **	7180	P-J	Field camp	--	unknown	Bifaces, flakes
26Eu980	6040	Big Sage	Location	1	unknown	Stone circle
26Eu982	6430	P-J	Cache	2	unknown	Stone circle
26Eu983	6280	Big Sage	Field camp	5890	Middle Archaic	Basalt scraper, core, Elko Eared point, etc.
26Eu984	6260	P-J	Field camp	1250	unknown	Bifaces, drill utilized flake
26Eu985	6340	P-J	Location	20	Protohistoric/contact	Shoshone Brownware pottery
26Eu986 *	6330	Big Sage	Field camp	1500	Protohistoric/contact	Shoshone Brownware pottery, tools & flakes
26Eu989	6750	P-J	Location	25	Middle, Late Archaic	Elko, Rosegate points, few flakes
26Eu995	6440	P-J	Field camp	1300	Middle Archaic	Elko point, bifaces & tools, flakes, metate
26Eu996	6350	Big Sage	Location	--	unknown	Point fragment, flakes
26Eu997 *	6320	Big Sage	Location	450000	unknown	Two metates, point tip, 4 flakes (diffuse)
26Eu1000	6380	P-J	Location	50	unknown	Flakes
26Eu1001	6400	P-J	Location	30	Early Archaic	Gatecliff point, biface, utilized & other flks
26Eu1003	6640	P-J	Location	--	unknown	Flakes only
26Eu1004	6455	P-J	Field camp	20	unknown	Hammerstone, biface, utilized & other flakes
26Eu1005 *	6850	Big Sage	Location	--	unknown	Three flakes
26Eu1008	6800	Big Sage	Location	100	unknown	Bifaces, flakes
26Eu1009	6840	P-J	Field camp	--	unknown	Bifaces, drill, flakes
26Eu1011 *	7400	P-J	Field camp	90000	Middle, Late Archaic	Elko, Rosegate, Cottonwood pts., mano, tools, flakes
26Eu1012	7140	P-J	Field camp	625	Middle, Late Archaic	Rosegate, Elko points, bifaces, flakes
26Eu1013	7300	Big Sage	Field camp	2000	unknown	Rosegate point, cores, bifaces, flakes
26Eu1014	6880	P-J	Location	--	unknown	Point tip, flakes
26Eu1015	6060	Big Sage	Field camp	1600	Early, Middle Archaic	Gatecliff, Large Corner-notched points, bifaces, flakes
26Eu1016	6560	Big Sage	Location	900	unknown	Flake tools, flakes
26Eu1017	6760	P-J	Location	--	Late Archaic	Rosegate point, bifaces, scraper, flakes
26Eu1018	6990	Big Sage	Location	--	unknown	Flakes
26Eu1019	6900	P-J	Location	225	unknown	Flakes
26Eu1020	6740	P-J	Location	6250	unknown	Biface, flakes
26Eu1022	7000	P-J	Field camp	67500	Middle, Late Archaic; Protohistoric/Contact	Elko, Rosegate points, scraper, bifaces, flake tools, flakes, Shoshone brownware frags.
26Eu1023	6730	P-J	Field camp	600	Middle Archaic	Elko point, biface, flakes
26Eu1024	6530	Big Sage	Location	--	Middle Archaic	Elko point, biface, flake tools, flakes
26Eu1025	6470	Big Sage	Location	1200	Middle Archaic	Elko point, point midsection, flakes
26Eu1026	7040	P-J	Field camp	82464	Middle, Late Archaic; Late Prehistoric	Cottonwood, Rosegate points, bifaces, scrapers, flake tools, flakes
26Eu1027	7240	P-J	Field camp	5000	Late Prehistoric	Cottonwood point, bifaces, midsection, flakes
26Eu1029 *	6860	P-J	Location	100	unknown	Utilized flake, flakes
26Eu1030	7090	P-J	Location	900	Early Archaic	Humboldt point, biface, flakes

* Site also has historic component ** Site previously recorded

Summary of Prehistoric Sites Recorded During the Class III Mt. Hope Survey (cont'd.)

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Period	Cultural Remains
26Eu1031	6850	P-J	Location	625	unknown	Point tip, flakes
26Eu1033	6520	Big Sage	Location	25	unknown	Flakes
26Eu1034 *	7150	P-J	Location	--	unknown	Biface, flakes, shatter
26Eu1035	7020	P-J	Location	100	unknown	Bifaces, flakes
26Eu1036	7130	P-J	Location	200	unknown	Biface, flakes
26Eu1040	7000	P-J	Field camp	60000	Early, Late Archaic	Gatecliff, Elko points, bifaces, groundstone, flakes
26Eu1041	7110	P-J	Location	--	Late Archaic	Rosegate point, flakes
26Eu1043	5925	Little Sage	Location	--	unknown	Basalt modified flake, flake
26Eu1044	6530	Big Sage	Field camp	400	unknown	Bifaces; point frags, metate frag, flakes
26Eu1046	6450	Big Sage	Location	--	unknown	Flakes
26Eu1047	6410	P-J	Location	25	unknown	Core/chopper, biface, flakes
26Eu1050	6490	Big Sage	Field camp	700	Middle Archaic	Elko point, mano, flake tool, flakes
26Eu1052	6420	Big Sage	Location	--	unknown	Biface, flakes
26Eu1053	7830	P-J	Location	--	Middle Archaic	Elko, Lg. Side-notched pts., flakes
26Eu1054	6750	P-J	Field camp	18750	Late Archaic; Protohistoric/Contact	Rosegate point, biface, groundstone, Shoshone Brownware
26Eu1055 *	6640	P-J	Location	isolate	unknown	Mano
26Eu1056 *	6680	P-J	Field camp	2500	Protohistoric/Contact	Point fgs., core, drill, bifaces, Shoshone Brownware
26Eu1057	6620	P-J	Location	--	Middle Archaic	Elko point, biface, flakes

* Site also has historic component

Summary of Historic Sites Recorded During the Class II Survey of the Mine Area.

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq. m)	Cultural Group	Cultural Remains
26EU784	6600	P-J/Sage	Fence Corral	40,000	----	Juniper pole fence; brush corral; axe cut stumps
26EU787	6330	Sagebrush	Railroad Siding/Camp	750		Summit Station --cans, bottles, stoneware, other debris
26EU790*	6200	Sagebrush	Railroad Camp	3500	Chinese	Chinese ceramics, buttons, cans, wood
26EU791	6280	Sagebrush	Debris	Isolate	----	Bottle fragment, boot leather
26EU794	6390	Sagebrush	Trail Debris	---	----	Cans, wagon part(?), milled lumber
26EU796	6480	P-J/Sage	Charcoal Making	7500	Italian(?)	Charcoal pits, cans, bottles, button, barrel hoop
26EU799	6520	P-J/Sage	Cairn	---	----	Rock cairn with axe cut poles
26EU800	6720	P-J	Charcoal Making	7500	Italian(?)	Charcoal pits/kilns; pole corrals; cans and glass bottles
26EU804	6540	P-J	Campsite	---	----	Stove pipe, cans, baling wire, button, bucket
26EU809*	6920	P-J	Habitation, Charcoal Making	900	Italian(?)	Charcoal kiln, rock cairn, cans, buttons, bottles, other debris
26EU810*	6720	P-J	Charcoal Making	2500	Italian(?)	Charcoal lens, cans, bottles, crockery
26EU811	6770	P-J	Charcoal Making	200	Italian(?)	Charcoal lens, bitters bottle, wood pile
26EU813	6780	P-J	Debris	Isolates	----	Cans, buckets
26EU816	6820	Sagebrush	Charcoal Making	24	Italian(?)	Charcoal lens, cans
26EU817	6490	Sagebrush	Woodcutting	Isolate	----	Axe head
26EU818	6720	P-J	Charcoal Making	---	Italian(?)	Charcoal lens, can
26EU819	7140	P-J	Charcoal Making	---	Italian(?)	Charcoal lens
26EU823	6570	P-J	Charcoal Making	105	Italian(?)	Charcoal lens
26EU825	6920	P-J	Debris	Isolates	----	Bottle base, 1/2 gallon can
26EU827	6460	P-J	Charcoal Making	48	Italian(?)	Charcoal lens
26EU831	6300	P-J/Sage	Woodcutting	200	----	Axe cut wood pile
26EU836	6480	P-J/Sage	Quarry	3750	Historic	Drilled holes in rock, cans, barrel hoops, milled wood

*Contains prehistoric component

Summary of Historic Sites Recorded During the Class III Mt. Hope Survey

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Cultural Group	Cultural Remains
26Eu875	7260	P-J	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu877	7080	J-Sage	Debris	isolate	unknown	Enameled cook pot & coffeepot
26Eu878	7100	J-Sage	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu880	6960	J-Sage	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu881	6990	J-Sage	Charcoal making	isolate	Italian(?)	Diffuse charcoal pile
26Eu883	7080	J-Sage	Charcoal making	100	Italian(?)	Charcoal platform
26Eu884	7040	J-Sage	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu887	6930	P-J	Debris	isolate	unknown	Lard can with handle
26Eu889	6770	P-J	Charcoal making	225	Italian(?)	Charcoal platform; debris frags.
26Eu890	6900	P-J	Debris	isolate	unknown	Tobacco tin; glass sherds
26Eu894	6950	J-Sage	Charcoal making	64	Italian(?)	Charcoal platform
26Eu895	6810	P-J	Debris	isolate	unknown	Large hole-in-top can
26Eu898	6730	P-J	Charcoal making	225	Italian(?)	Charcoal platform
26Eu903	6880	J-Sage	Debris	isolate	unknown	Metal pot handle
26Eu904	7100	J-Sage	Debris	isolate	unknown	Metal bowl
26Eu905	7140	J-Sage	Debris	isolate	unknown	Patent medicine bottle frag.
26Eu909	6860	J-Sage	Charcoal making	120	Italian(?)	Charcoal platform
26Eu910	6870	J-Sage	Charcoal making	300	Italian(?)	Charcoal platform
26Eu912	6550	P-J	Debris	isolate	unknown	Hole-in-top can
26Eu914	6740	J-Sage	Charcoal making	70	Italian(?)	Charcoal platform
26Eu918	6850	P-J	Charcoal making	169	Italian(?)	Charcoal platform
26Eu921	6800	Big Sage	Debris	isolate	unknown	Hole-in-top can
26Eu923	6550	J-Sage	Charcoal making	50	Italian(?)	Charcoal platform
26Eu924	6590	J-Sage	Charcoal making	25	Italian(?)	Charcoal platform
26Eu925	6480	J-Sage	Debris	isolate	unknown	Four hole-in-top cans
26Eu926	6490	J-Sage	Debris	isolate	unknown	Wash tub
26Eu927	6590	J-Sage	Debris	50	Italian(?)	Charcoal platform
26Eu928	6535	P-J	Debris	isolate	unknown	Broken white ceramic cup
26Eu931	6560	J-Sage	Charcoal making	100	Italian(?)	Charcoal platform

* Site also has prehistoric component

Summary of Historic Sites Recorded During the Class III Mt. Hope Survey (cont'd.)

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Cultural Group	Cultural Remains
26Eu935	6470	J-Sage	Charcoal making	50	Italian(?)	Charcoal platform
26Eu936 *	6420	J-Sage	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu937	6440	J-Sage	Debris	isolate	unknown	Five # can lid, "J.A. Cobdold & Son...White Rose"
26Eu939	6360	J-Sage	Charcoal making	64	Italian(?)	Charcoal platform
26Eu940	6310	P-J	Debris	isolate	unknown	Hole-in-top can
26Eu942	6330	J-Sage	Debris	isolate	unknown	Hole-in-top can; olive glass bottle base, kickup
26Eu943	6160	Big Sage	Debris	isolate	unknown	Champagne bottle
26Eu944	6170	Big Sage	Debris	isolate	unknown	Hole-in-top can
26Eu945	6180	Big Sage	Debris	isolate	unknown	Hole-in-top can
26Eu947	6100	Big Sage	Debris	isolate	unknown	Square base bottle frags.
26Eu952	6430	Big Sage	Debris	isolate	unknown	Enameled metal bowl
26Eu953	6440	J-Sage	Charcoal making	450	Italian(?)	Charcoal platform; metal pail
26Eu954	6350	J-Sage	Debris	isolate	unknown	Cut-down 55 gal. drum with handles
26Eu957	6270	P-J	Debris	isolate	unknown	Ceramic pasteware plate fragment
26Eu962	5990	Big Sage	Debris	isolate	unknown	Well/cistern cover, Patent May 10 04
26Eu963	6430	Big Sage	Charcoal making	isolate	Italian(?)	Charcoal platform
26Eu964	6580	J-Sage	Debris	isolate	unknown	6" link chain with hook
26Eu965	6500	J-Sage	Debris	isolate	unknown	"Hercules Powder" dynamite box; 1 can
26Eu967	6800	J-Sage	Debris	isolate	unknown	Hole-in-top lid
26Eu968	6800	J-Sage	Debris	isolate	unknown	Can lid
26Eu969	6720	J-Sage	Debris	isolate	unknown	Hole-in-top can lid
26Eu971	6590	J-Sage	Charcoal making	200	Italian(?)	Two charcoal platforms
26Eu973	6600	J-Sage	Debris	isolate	unknown	Cast iron metal strap
26Eu974	6600	J-Sage	Charcoal making	225	Italian(?)	Charcoal platform
26Eu975	6580	J-Sage	Charcoal making	200	Italian(?)	Charcoal platform
26Eu977	6630	J-Sage	Charcoal making	100	Italian(?)	Charcoal platform
26Eu978	7440	B-S	Charcoal making	625	Italian(?)	Charcoal platform; one hole-in-top can
26Eu981	6360	P-J	Charcoal making	360	Italian(?)	3 charcoal platforms
26Eu986 *	6330	Big Sage	Isolate	---	unknown	Olive glass kickup base; green glass fgs.
26Eu987	6580	Big Sage	Charcoal making	100	Italian(?)	1 charcoal platform; 2 solder seam cans
26Eu988	6600	Big Sage	Charcoal making	2500	Italian(?)	3-4 charcoal platforms at camp; glass, metal fgs.; heat-altered rock (kiln?)

* Site also has prehistoric component

Summary of Historic Sites Recorded During the Class III Mt. Hope Survey (cont'd.)

Site No.	Elev. (ft)	Vegetation Zone	Site Type	Area (sq m)	Cultural Group	Cultural Remains
26Eu990	6740	P-J	unknown	25	unknown	Pit and rock ring
26Eu991	6700	P-J	Charcoal making	260	Italian(?)	Charcoal platform; axe head & hole-in-top can
26Eu992	6590	P-J	Debris	25	unknown	Hole-in-top can scatter
26Eu993	6560	P-J	Charcoal making	150	Italian(?)	Charcoal platform; glass fgs; metal bucket
26Eu994	6480	Big Sage	Charcoal making	30	Italian(?)	Charcoal platform; hole-in-top can; home made sieve
26Eu997 *	6320	Big Sage	Debris	1	unknown	3 crockery fragments
26Eu998	6340	P-J	Debris	---	unknown	Glass, metal, hole-in-top cans; opium tin
26Eu999	6320	Big Sage	Debris	---	unknown	2 hole-in-top cans; 1 crimped seam can
26Eu1002	6670	Big Sage	Charcoal making	100	Italian(?)	Charcoal platform; baking powder lid
26Eu1005 *	6850	P-J	Debris	---	unknown	1 glass fragment
26Eu1006	6840	Big Sage	Debris	---	unknown	2 soldered seam cans; homemade sieve; milled wood
26Eu1007	6800	Big Sage	Charcoal making	65	Italian(?)	Charcoal platform; glass; solder seam cans; milled wood
26Eu1010	6930	P-J	Charcoal making	---	Italian(?)	Charcoal platform; 85+ hole-in-top cans
26Eu1011 *	7400	P-J	Debris	90,000	unknown	Pipe frag.; part of large prehistoric site
26Eu1021	6780	P-J	mining	600	unknown	Pit; shovels; hole-in-top cans & others; glass
26Eu1028	6900	Big Sage	Debris	2400	unknown	Hole-in-top cans; glass, crockery, metal fgs.
26Eu1029 *	6860	P-J	Debris	100	unknown	Hole-in-top cans; tobacco tins
26Eu1032	6580	P-J	Debris	1200	unknown	Hole-in-top cans; barrel hoop; bucket; milled box wood
26Eu1034 *	7150	P-J	Debris	---	unknown	Hole-in-top cans; metal fgs.; table knife
26Eu1037	6740	Big Sage	Charcoal making	400	Italian(?)	Charcoal platform; metal fgs.
26Eu1038	6635	Big Sage	Charcoal making	400	Italian(?)	Charcoal platform; kerosene can
26Eu1039	6960	P-J	Charcoal making	100	Italian(?)	Charcoal platform; glass, metal fgs.
26Eu1042	7020	P-J	Debris	2000	unknown	Small cabin (root cellar?); glass, metal, ceramic fgs.; hole-in-top cans
26Eu1045	6420	P-J	Debris	500	unknown	Glass; shovel; bucket; hole-in-top cans; bowl
26Eu1048	6380	P-J	Debris	---	unknown	Solder seam, crimp seam, evap. milk cans
26Eu1049	6340	P-J	Debris	---	unknown	Crimp seam & tobacco cans; shoe; washtub
26Eu1055 *	6640	P-J	Debris	400	unknown	Skillet; coffee pot; solder seam cans; etc.
26Eu1056 *	6680	P-J	Debris	2500	unknown	Solder seam cans; glass

* Site also has prehistoric component

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

R'S CARD
86 no.7 1984
of Land
bdenum project
OFFICE
DATE RETURNED
(Continued on reverse)

TD 195 .M5 M686 no.7 1984
U. S. Bureau of Land
Management.
Mt. Hope molybdenum project

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225